Unasylva

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POWER	1 cheval-vapeur (c. v.)	= 0.986 horse-power (h. p.)	1 horse-power	= 1.0142 cheval-vapeur

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Cover Photograph: *A view from the porch of a house in one of the new Forest Villages discussed in H. L. Edlin's article in this issue.*

NEW FORESTS

CREATING new forests or re-creating and maintaining existing forests is engaging the attention of more and more countries. Governments, private organizations and individuals are happily increasing their budgets for tree planting, selecting new nursery sites, expanding present nurseries, and deciding on new plantation areas. Sometimes this planning and preparation concerns itself merely with the planting of trees — any kind, any seed, any place. This is certainly not to be discouraged — as it may represent a tremendous stride forward away from former apathy towards afforestation or reforestation. But increasingly, foresters are looking further ahead — after looking back over their shoulders at their own past experiences and those of their neighbors — as to what exactly they hope to accomplish by tree planting.

Once the planter knows where he is going, he frequently needs help as to which species will best meet his purpose. That is, which species will yield the kind and quantity of product desired on the planting sites he has available? Where can he get the seed he needs; how can he be sure that such seed will be of superior parent-stock of the correct geographic strain, or from the right height zone; and that the seed has the degree of purity and germinative capacity he requires? How should it be stored after he receives it; what treatments should he use on the seed to get the maximum germination? What are the latest developments in nursery practices, such as soil conditioning, chemical weed control, root formation stimulation, lifting and packing the seedlings and transplants. And how about the mechanization of operations — both in the nursery and in planting? Will they be suitable under his field conditions? And more than anything else, what precautions are necessary to prevent the spread of disease or insect outbreaks in any planting scheme?

Many countries have had considerable experience in finding answers to these and related questions. FAO is now trying to bring together the results of this experience in seed handling, nursery operations, and planting methods. Forest administrations and heads of forest experiment stations are being asked to cooperate by providing lists of species whose seed they collect for reforestation, and lists of private seed dealers and the species which they handle, and to participate in exchange of small lots of seeds for experimental trials, and to issue an acceptable certificate of origin and quality for each seed lot collected and shipped. In return, FAO will try to serve as a clearing house to help the co-operating agencies obtain the experimental quantities of seed they themselves need. This pooling of effort and experience is bound to add up to more than the sum of its individual parts.

On such a foundation, new forests could be created in confidence — new forests that would yield timber and fuelwood and pulpwood whereby new villages of people could find prosperity; where re-created old forests would protect soils from blowing and washing away so that old villages could find new and more abundant lives.

Surely this objective of FAO and its member governments more than justifies the extra work which will be required of the foresters of the world.

Two typical forest villages, built under the plan discussed in these pages, are seen here. Above is that of Abertridwr, near the forest at Lake Vyrnwy in North Wales. The buildings on the right are the school and the village hall. Below, closely grouped in a deep valley, is the village of Braeval in Scotland; plantations of larch, Scots pine and spruce in the background are part of the Loch Ard National Park.

Britain's New Forest Villages

By H. L. EDLIN,
Forestry Commission, United Kingdom

A REMARKABLE recent development in the forestry program of Great Britain has been the creation of villages to house forest workers. This is an integral part of the Forestry Commission's scheme to restore and increase the country's resources of growing timber, which involves, in addition to the care of privately-owned woodlands, the formation over a period of about fifty years, of some 3 million acres (about 1.2 million hectares) of new State forests. Great Britain, with an average population density of 550 people per square mile (212 per square kilometer) would appear to offer little scope for new settlements. But this population is very unevenly distributed, and much of the land available for new afforestation is situated in sparsely-peopled upland regions, particularly in Scotland, Wales, and the northern counties of England. Many of the 413 forests which the Commission has established since 1919 are situated so far from any existing town or village that their labor supply presents a problem. Although, in many cases, the provision of a few houses in or near an existing center may be all that is required, there are several forest areas so remotely placed that they need all the amenities of a fully developed community. Here the forestry department must plan, and to some extent provide, shops, schools, churches, inns, and meeting halls, as well as dwelling-houses. This work must, of course, be done in co-operation with other central and local government authorities which are concerned with particular aspects of public welfare, such as education; but the forestry department, which alone needs the new labor force, remains the body primarly concerned. It must enlist the services of expert town planners, architects, engineers, and builders, and devote attention to matters far removed from silviculture and the management of woodlands. But all this is worth while, and indeed essential, for without a satisfactory and settled labor force, there can be no development of the new forests.

The need for new villages

Few forest workers in Britain have sufficient resources to build or purchase their own houses; most of them are tenants, paying a weekly rent. The typical rural house or cottage, built of stone or brick, is expensive to erect, though very durable. Sound construction is essential, owing to the variable British climate, while the standard of accommodation required at the present day is a high one. On private forestry estates, it is usual for the landowner to provide cottages for some or all of his workmen, and a similar policy has been followed by the Forestry Commission since it began operations in 1919. When land is acquired for afforestation, some cottages are often taken over with it, and others may be built later as the need arises. Up till the outbreak of World War II, many new cottages were so planned that they had a small area of agricultural land attached to them, forming a unit known as a Forest Workers Holding; this enabled the tenant to divide his time, on an agreed basis, between work in the woods and work on his own land. These measures were adequate during the early years of State forest development, when only a small nucleus of men was needed to plant and tend each forest. But expanding programs of afforestation, new methods of fire protection, and above all, the greatly increased volume of utilization work that results as soon as the young woods reach the thinning stage, have made it essential, in most of the larger forests, to concentrate the building of new houses in villages or small community groups.

Brief mention must be made of two alternative methods of providing labor at new forests. Both are still employed to some extent as temporary expedients, but neither can meet the long-term need. One is the provision of hostels, in which the workers, who are usually young unmarried men, live. Since buildings and domestic staff must be provided, this method does not prove much cheaper, in terms of current expenditure for each actively-employed man, than the village. Its greatest drawback, however, is that it does not attract a stable labor force; men are easily recruited but, having no permanent home, leave just as readily; thus a hostel cannot be relied on to provide a permanent body of skilled and experienced workmen. The second alternative is to transport men from the nearest town. Here again the cost of transport, and the time lost in traveling, result in the net cost of providing labor being little less than that of housing the men nearer the woods. As with the hostel, there is no certainty that a permanent labor force can be built up, for the town-dwellers are favorably placed for taking up other employment. Worst of all, from the viewpoint of the local forester, is the fact that they cannot readily be assembled to fight a forest fire, or to meet any similar emergency. The first cost of a forest village may be high compared with such expedients, but it represents a permanent investment in the forest estate as a whole.

Financing villages and their social services

The new villages are being built at a time when many difficulties, attributable mainly to World War II, have to be overcome. Shortages of building materials, especially of timber, must be faced, and there is also a lack in some districts of skilled craftsmen. Building costs are high, and most house-building has to be subsidied by the Government; but the new forest villages, being constructed by a State department, do not receive such subsidies. Their cost is met from funds supplied to the Forestry Commission for the general program of forest development. The rents paid by forest workers are set at moderate figures,

Largest of the new forests of Britain will be the group on the English/Scottish Border, centered round Kielder Forest. The new village, of which a model is seen above, is being built on a sheltered site in a bend of the North Tyne river. The actual site is seen to the left of Kielder Castle, in the center of the photograph in the opposite page. The photograph of the site was taken in 1948, before work on the village had commenced, and the site is there viewed in the opposite direction to that of the model.

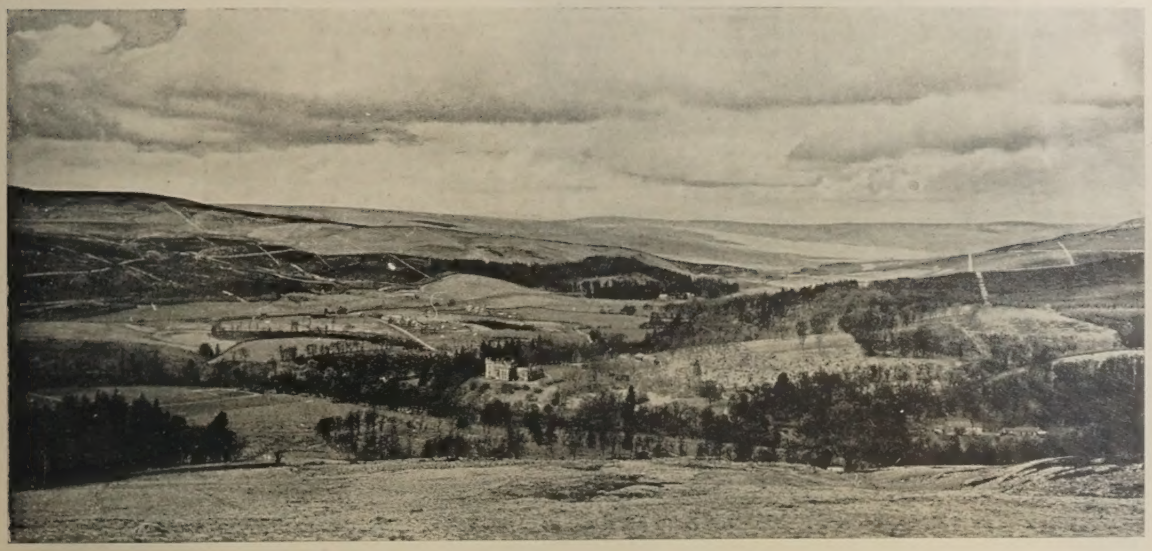
similar to those fixed by local authorities for subsidized houses. Allowing for the usual periodical repairs, these are about sufficient to meet the depreciation of the capital value of each house, but are not enough to give any substantial return on the capital invested. The value of the scheme is measured in terms of adequate and expert labor, and efficient fire protection. It is, of course, inherent in this state of affairs that all houses intended for workers must be occupied by men actually employed in the State forests, and all dwellings are let on this understanding.

Besides his rent, each house tenant must pay a local rate charge, which goes to meet the expenses of the County Council for his district, and of certain other local government authorities. The expenses of these bodies are met to some degree, however, from the funds of the central Government. The tenant of a Forestry Commission house is assessed for these rates in just the same way as any other householder, and he receives substantially the same services in return. The services that require substantial shares of the total rates are usually: the education of schoolchildren, upkeep of the main roads, public health and welfare services, the policing of the county, and the provision of fire brigades and public libraries. Although the provision of these social services is primarily the concern of the local government authorities, working in conjunction with central government departments, the Forestry Commission can often assist, especially in the initial stages of establishing a forest village; in particular, by setting aside sites for schools and similar public buildings, it can give material help at little cost.

Planning a forest village

The planning of a whole village, in which it is expected that a new community will grow up, calls in fact for attention to many aspects of social life that do not need so much consideration where only a few scattered houses are being built. Allied to the building of dwelling-houses come their ancillary services, such as the provision of access roads, water supply and sewage and refuse disposal. If at all possible, electric power must be supplied. The next need, in order of urgency, is usually for a village hall, to serve as a meeting place for all kinds of communal activities, and especially for entertainments such as dances, concerts, plays, and film shows. The lack of shops seldom causes immediate hardship in these remote localities, because tradesmen's vans visit them from the nearest town, serving in effect as mobile shops. But, for day-to-day needs, shops on the spot are most desirable, and the village plans provide for the building of an appropriate number; at each village the first shop is expected to take the form of a general store, providing groceries, sweets, tobacco, stationery, a wide range of other merchandise and possibly also postal services.

Some regard may have to be paid to milk supplies, though these are usually forthcoming from farms remaining on the better agricultural land near the forest. A school must be built at an early date, as otherwise the children are likely to have a long daily journey, on foot or by motor-bus, to the nearest existing school, which may well become overcrowded. The religious needs of the people must be met, and this is complicated by the fact that, in most districts, two or three religious denominations are found, and each may require its separate church or meeting room. The village inn is a traditional feature of nearly every old-established English village, and besides such simple public houses the remote situation of some forest villages may make it desirable to build a hotel with accommodation for overnight visitors. Communications are very important, and the existing postal arrangements are likely to need expanding by the addition of posting boxes and telephone kiosks, and possibly of new post offices. Public transport to the nearest market town, either by rail or motor bus, must be arranged at suitable times, and provision may have to be made for garages for motor cars to supplement such services.



Areas for recreation, playing fields for summer and winter games, and children's playgrounds, must all be fitted into the scheme. As an indication of what village planning can involve, consideration has already been given to providing sites for houses for local police constables, and other officials, to organizing banking facilities, and even to setting aside land for cemeteries!

A forestry department would be going outside its normal field of activities if it set out, itself, to provide schools or bus services or to operate public houses. The procedure is, therefore, to co-operate with the appropriate local agency, which may be a local government authority, a nationalized undertaking, a voluntary society, a religious body or a commercial firm, to ensure that such services are provided, and that the needs of the villagers are met. Otherwise, no matter how attractive the houses, or how low the rent, the community will not prosper. Therefore, adequate provision for all essential services must be made in the original plans.

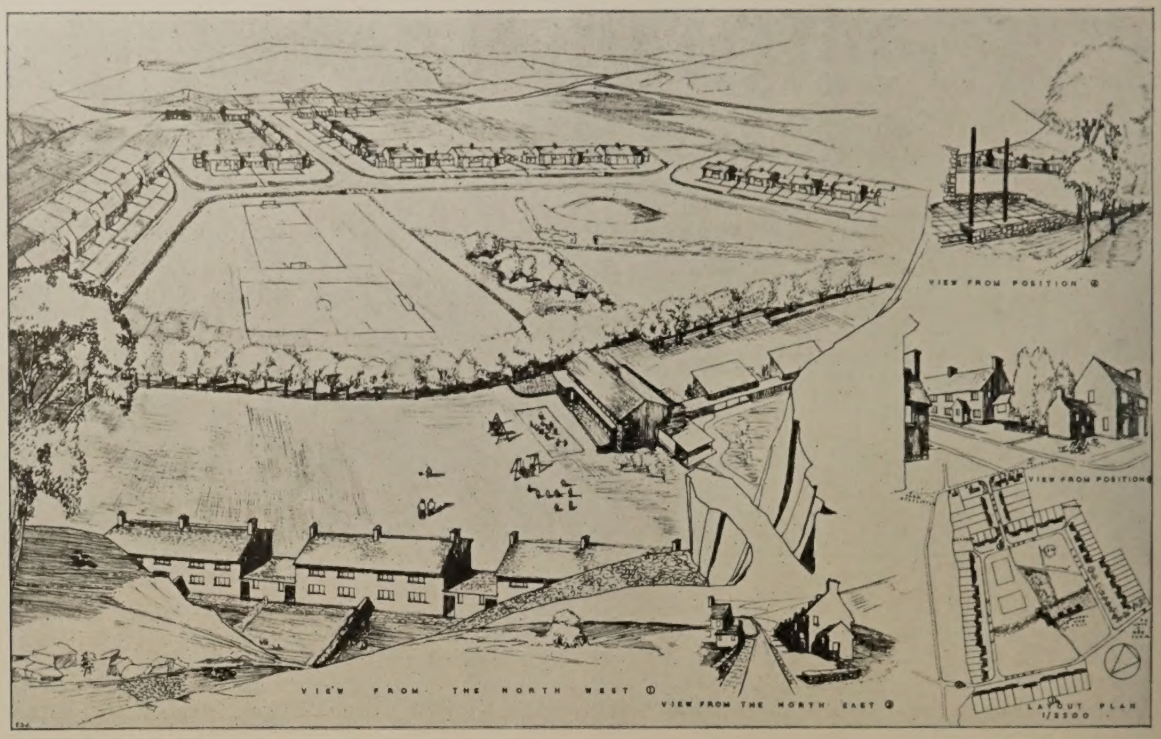
Not every village calls for the complete organization of all requisite services. Sometimes the chosen site is right beside the main water or electric supply, or a bus route; but every development raises its special problems, needing their particular local answers. Besides the requirements of the inhabitants, the needs of forest management must be kept in mind. A village is clearly a suitable center for administrative offices, stores, and a firefighting depot; it is likely to require, either immediately or in the future, sawmills and other installations for handling forest produce. Provision for all these must be made in the plans.

Obviously the creation of such a complete community takes time, and in practice it is best achieved in well-defined stages. Most of the village plans provide for a series of "developments". Thus, the first "development" will usually provide a small group of houses to meet the earliest need for men employed on afforestation; the second "development" may add more houses for men who undertake the first thinnings, and also the first shop and the village hall; a third "development" may bring in still more houses, another shop, a church, and an inn; ultimately sawmills may be added, with still more houses for those who work in them. This gradual expansion means that houses are not built until men are ready to move into them, and also that the capital cost of the work is spread over a long span of years. It is, of course, essential that there shall be a master-plan so that each step leads on to the next, and in practice the whole village is designed in broad outline before work on the first "development" is begun. This first stage is often the most expensive, because it includes the initial work on site clearance, road construction, water and power supplies, and sewerage. For example, a water main capable of supplying 250 houses may have to be put in, although only 50 houses are being erected immediately. But in the long run a comprehensive plan is an economy.

Organizing village construction

An important feature in the planning and construction of these villages, and the general administration of the Forestry Commission's housing arrangements, is the employment, as permanent members of the Department's staff, of qualified land agents. These men, who are known as Estates Officers, work side by side with the Forest Officers, and form part of the same technical corps. Their training, however, has been in estate management, and they are fully qualified members of the appropriate professional associations. They provide the essential continuity for the schemes, and co-ordinate the work of the architects, engineers, and builders with the general program of forest management. A senior estate officer is attached to the office of each of the eleven Conservators of Forests, while one of his assistants, usually a clerk of works, supervises operations at the actual building site.

The actual planning of the village is done by a qualified architect, who is not permanently employed by the Forestry Commission, but is engaged for a specific project. He is assisted by a land surveyor and a quantity surveyor, while if extensive site works are needed, the services of a civil engineer may also be



Before the new forests have grown, the villages to house the forest workers have to be started. The bare landscape at the back of Llwynygog will one day be part of the Harren Forest, North Wales. The actual layout of the village is shown above, and the first groups of houses, already inhabited, are seen below.

required. While the architect plans the lay-out and design of the buildings, and exercises the general oversight of their construction, the actual building is usually done by a firm of contractors, several tenders normally being obtained before the work is put in hand. Occasionally two architects may be employed, one being responsible for the planning of the village as a whole, and the other for the detailed design and construction of the houses. These experts are paid according to a scale fixed by their professional association.

No attempt has been made to standardize site plans, house designs, or even building materials. Different architects are employed for different villages, and even at the same village they are encouraged to vary the designs of the dwelling houses. In this way it is hoped to give each settlement its own individuality, and also to make the best use of the available ground. The site itself is carefully chosen and where no suitable ground is available within the forest boundary, it may be necessary to acquire land nearby.

The first proposal to construct a forest village usually comes from the Conservator of Forests for the region concerned, who can foresee the need for increased lobor as a particular forest develops. If this proposal is approved by higher authority, the necessary funds are made available and the construction of the village proceeds under the guidance of the Estates staff. In the early stages of the program, assistance was obtained from other Government departments, and occasionally from local authorities engaged on similar house-building schemes, but as a rule the forestry department supervises the contracts itself.

The completion of the construction of a village, or of a definite stage in its development, is usually made the occasion of a formal opening by an individual prominent in local affairs. This serves to bring the existence of the new community to the notice of the press and the public, which in turn helps to ensure sympathetic consideration should any problems — for example those of transport or education facilities — arise. Tenants for the new houses are readily found, preference being given to young men already in the employment of the Forestry Commission, who wish to get married and set up a home, or to obtain better accommodation for an existing family. Quite a number of first tenants, however, are men who have left employment in the towns because they prefer to work in the forests, provided their living conditions are satisfactory. In this way the forest villages help to arrest the depopulation of rural areas, which has become a serious problem in some parts of Britain.

The Commission's housing program

Statistics of building progress have not been kept separately for houses in forest villages and for those elsewhere, but to give an idea of the magnitude of the effort, during the year ended 30th September 1951, expenditure on new buildings was nearly one million pounds sterling, 324 houses were completed, while work was in progress on a further 636. The total number of cottages acquired or built by the Forestry Commission at that date was 1,686, while there were also 1,466 Forest Workers Holdings, making a total of 3,152. It is estimated that, for every two houses, three forest workers should be forthcoming, which means that there was accommodation for some 4,700 men and boys, or roughly one-third of the Department's total labor force of 12,300. The total number of people, including dependents as well as forest workers, living in workmen's houses provided by the Forestry Commission, has not been accurately ascertained, but is probably not far short of 10,000. In addition to these houses for workers, the Department has also provided 475 houses for its supervisory foresters. The program does not envisage the housing of every forest worker in a Departmental house; many, for example, will live in houses built by local government authorities, such as the County Councils, to meet the general housing needs of their districts. But on a basis of one man to every 50 acres (20 hectares) of productive forest, it is apparent that the labor force for the ultimate State forest area of 3 million acres (1.2 million hectares) will be about 60,000, requiring some 40,000 houses. If only half of these are provided by the Forestry Commission, it will still be necessary to construct some 17,000 houses during the next 45 years. Hence the program is a long-term one, needing much forward planning, and although some of the schemes to be described may appear somewhat ambitious, they are nevertheless in keeping with the scale of forest development.

Llwyn-y-Gog, a typical village

To show, by an actual example, how the work is carried out, the progress to date of a typical village may be considered. This is Llwyn-y-Gog, situated beside Hafren Forest in the County of Montgomery, in the center of Wales. "Llwyn-y-Gog" means "the wood of the cuckoo", while "Hafren" is the original Welsh name for the River Severn, which rises within the forest on the slopes of Plynlimon, a mountain 2,427 feet (740 meters) high. This forest is quite a young one, having been formed only sixteen years ago, in 1937, by the acquisition of twelve hill sheep farms. Its total area is 10,614 acres (4,250 hectares), of which about three-quarters (7,506 acres or 3,000 hectares) is available for afforestation. The remaining quarter, comprising most of the better land, is reserved for agriculture, and, since all the farms have been kept in being, though with reduced areas of land, the farmhouses cannot provide much accommodation for forest workers. At first, when tree planting was just beginning, enough labor could be found from the local cottagers, although these pastoral uplands are very thinly populated; later it became necessary to transport men each day by motor lorry from Llanidloes, the nearest market town, some nine miles (14½ kilometers away. Except during working hours, there was no organized body of labor available at the forest to deal with forest fires. By 1951, the plantations extended to nearly 5,000 acres (2,000 hectares); 700 acres (280 hectares) were being planted each year, 100 acres (40 hectares) of the oldest plantations already required their first thinning, and it was apparent that within a few years a very much larger annual thinning program would have to be carried out. Already over fifty men were employed, and it was obviously unsatisfactory to transport them each day from a distant town.

Cottages for the forest workers have been carefully chosen to suit their surroundings in the Forestry Commission villages. Those seen above, close to the very edge of the forest, are Swedish timber buildings. This beautiful place is Glenbranter Forest in the Argyll National Forest Park, Scotland.

In 1948 the Forestry Commission, having selected a site in consultation with the Montgomeryshire County Council, engaged a prominent Welsh architect, Mr. T. Alwyn Lloyd of Cardiff, to draw up plans for a village that would ultimately comprise 80 houses, with at least one shop, a school, and a village hall. As a first "development" twenty houses have been built which, together with eight more on another site a few miles away, now provide accommodation for half of the men employed. Construction began in 1949, and the houses were first occupied in 1951. The usual accommodation in each house comprises:

On the ground foor: An entrance hall, a sitting room, a large kitchen which also serves as a living room, and a scullery with a pantry attached.

Upstairs: Three bedrooms, bathroom, separate water closet and cupboards.

Outside: Wash-house, water-closet, sheds for storing fuel and bicycles. Both hot and cold water systems are provided, and each house has about 3 acres (rather over one hectare) of garden.

Water supplies have been provided by damming a mountain stream in the forest, installing a ram and constructing a small reservoir. A modern sewage disposal plant has been built. There is a temporary electric light plant, which, it is anticipated, will be superseded by a power line of the National Grid System. The new village roads are linked to a public highway that runs nearby, and arrangements have been made with the local bus company to run services, once a week on market day, to the town of Llanidloes. School and postal facilities are available at the hamlet of Staylittle, a mile from the new village; ultimately it is proposed to establish them in the village itself. There are also chapels at Staylittle for religious services. The nearest inn is three miles away.

The first communal building to be completed at Llwyn-y-Gog is the temporary village hall, opened in October 1951. It was built by the Forestry Commission, but has been leased to local trustees, who undertake its management. Its main room measures 50 feet by 20 feet (16 by 6 meters); and it has a stage and a number of smaller rooms. Already it has been used for whist drives, theatrical and musical performances, political meetings, and as the headquarters of the local women's institute, the County library branch and the infant welfare organization of the local health authority. As the nearest alternative hall is nine miles away, in Llanidloes, the value of this meeting place to

Different again from the houses in the other villages illustrated in these pages, these are at Santon Downham, a village in the great East Anglian forest of Thetford. Care has been taken here to group the cottages in the traditional manner of southern England, round a village "green." Unlike the others illustrated, this village is in flat, lowland country.

the new forest community is obvious. The other communal buildings provided so far comprise a general shop and a range of lock-up garages to house cars and motorcycles. A shelter belt of broadleaved and coniferous trees has been provided around the village. The houses were occupied as soon as they were ready; thirteen of the tenants are Welshmen, nearly all being Welsh-speaking, while the remaining seven have come from England. With their wives and children, they already make up a community of over seventy people; future extensions are likely to raise this figure to over 300.

Much the same pattern of development, on a greater or lesser scale, is to be seen at most of the forests where new villages have been found essential. At the Lake Vyrnwy Woodlands, in Montgomeryshire, there is an interesting joint scheme involving the Forestry Commission and the Liverpool Corporation Waterworks Department, who jointly manage the woods around the reservoir, and also the Montgomeryshire County Council, which is responsible for education in the district. Twenty houses have been built, forming the new village of Abertridwr, near Llanwddyn, and the school is so designed that it will also serve as a village hall in the evenings, thus saving the cost of an extra building.

The North Tyne schemes

Work on an even larger scale is being carried out in the valley of the North Tyne river, Northumberland, the northernmost county of England next to the Scottish border. Here three adjacent forests, Kielder, Wark and Redesdale, have a combined total area of 121,500 acres (49,000 hectares) or 190 square miles (490 square kilometers). Of this 48,500 acres (19,500 hectares) have already been afforested, while it is anticipated that 82,500 acres (33,500 hectares) will ultimately be under tree crops. This territory has become available for large-scale afforestation because of its unsuitability for economic agricultural use, and within its boundaries there was, at the time when it was taken over, no settlement large enough to be called a village, but only a few scattered hill farms. On a basis of one man to 50 acres actually afforested it is evident that about 1,650 active forest workers must eventually be found, so that, when their dependents are included, the total population of this new forest region will be about 5,000. So large a number is plainly too great for one village, and in fact seven villages have been planned of which three are already in course of construction. To make the best use of this exceptional opportunity for rural reconstruction, the Forestry Commission has secured the services of Dr. Thomas Sharp, one of Britain's leading consultants in town planning, who is himself a native of north-east England. Dr. Sharp has guided the project for several years, considering every detail from the choice of suitable sites and the design of buildings appropriate to their surroundings, down to the naming of the new streets. Each village has its own individual design, and each, though surrounded by the forest, has adequate open ground reserved for games and recreation. At Kielder Forest itself, a hundred houses for forest workers, scattered along the fifteen-mile stretch of the valley of the North Tyne, had already been provided — some by adaptation and some by new construction — before work on the first new villages began; but it is obviously better, both from the stand-

point of forest management and that of social life, to have the future houses more closely grouped.

The new Kielder Village has as its nucleus an old shooting lodge, Kielder Castle, which now serves partly as administrative offices for the forest staff, and partly as a social club. There is also a railway station and a group of sixteen forest workers houses built prior to 1939. The first postwar "development" of twenty new houses was under way in May 1952, when the new village was formally opened by the Chairman of the Commission, the late Lord Robinson of Kielder Forest and Adelaide, who took his title in part from this new forest, and in part from his Australian birthplace. Work is now actively proceding on the second "development" of thirty-eight houses, which are being sited on a stretch of flat land in a bend of the river, known as Butteryhaugh. The complete plan provides for over 250 houses, grouped around a central square, with a church, a meeting hall, an inn, a row of shops, a school and playing fields. The estimated ultimate population will be over 1,000.

At Redesdale Forest, 47 houses of the 120 comprising the new village of Byrness are nearly ready for occupation; although in the heart of the forest it borders on one of the few main roads from England into Scotland. At Wark Forest, to the south, work is proceeding on the new village of Stonehaughshields which will eventually comprise over 200 houses. Several other schemes are in progress in the northern counties of England.

Santon Downham village

At Thetford Chase Forest, on the borders of Norfolk and Suffolk, however, the increase of employment following the afforestation — and growing utilization — of 33,000 acres (13,400 hectares) of hitherto nearly barren heathland has necessitated a new village at Santon Downham, near the small manufacturing town of Brandon. Particular interest attaches to this village inasmuch as it is a revival of a very ancient one, and represents perhaps the earliest effort of the Forestry Commission at community planning. The old church at Santon Downham includes Norman stonework dating back to the eleventh century A. D.; but when the land was acquired for afforestation in 1922, little trace remained of the former settlement, and the parish formed a sporting estate, centered on the mansion house of Santon Downham Hall. When this house was demolished, six cottages attached to it became available for forest workers. In addition, the outbuildings such as stables and coach-houses were converted into dwellings, and in this way, a further sixteen houses were provided. Then a shop was opened, and the workers themselves organized a meeting hall and a sports club, with a tennis court and a bowling green.

After 1945, the increased work in the forest led to the setting up of a produce depot at Brandon, and administrative offices, an engineering depot, and a firefighting center at Santon Downham. Plans were therefore made for a considerable expansion of the village. The layout provides for eighty new houses to be grouped around a central village green near the old church, and also for the usual hall, shops and playing field. Between 1947 and 1949, the first forty-one houses were completed to form an attractive settlement in the heart of the pine forest. Most of the new houses are of brick, but eight are of prefabricated timber construction and were imported from Sweden, while at Brandon two cedar houses from Canada have been put up.

Forest villages in Scotland

The first forest village to be established in Scotland is that at the Forest of Ae, about nine miles north of the town of Dumfries. Here 5,500 acres of hill land have gradually been afforested, mainly with spruce, since 1927; the final extent of the plantations will be 8,000 acres. The few scattered farms and cottages provided little labor, but up to 1947 the need was met by building ten cottages, including several wooden bungalows roofed with wooden shingles. Then plans were made for the new village of Ae, which will comprise eighty houses and the usual public buildings. The work was begun the same year at a ceremony performed by the Rt. Hon. Thomas Johnston, a Forestry Commissioner and former Secretary of State for Scotland. The first group of fourteen houses was completed in 1950, and the second batch of sixteen in 1951. Designed by an Edinburgh architect, the houses conform to a traditional Scottish pattern, being high, with narrow windows, white walls and gray roofs, and are in keeping with their upland site.

Further west, but in the same Southern Uplands, a big scheme is developing at the Glen Trool National Forest Park, in Ayrshire and Kirkcudbrightshire, where there are 116,500 acres of hill land comprised in five forest units; already 14,000 acres have been planted up, while 31,000 acres have still to be afforested. There is no large town, and very few villages, in the whole region, and to carry out the initial stages of the work, men have had to be transported each day from places twenty miles away. Now a village, to be known as Minnoch after the river nearby, has been planned for Glen Trool Forest itself; it will consist of about 110 houses, of which forty are now going up. In this part of Scotland, for various reasons, two patterns of development are being followed — in some instances small communities are being added to existing towns or villages, while elsewhere completely new villages are being set up.

The Scottish Highlands, where forestry is particularly important as a means of arresting rural depopulation, have not so far necessitated the building of large forest villages. Adequate labor is often forthcoming from former crofters or fishermen who have turned to forestry as a more profitable employment. Where new building is found essential, it is often difficult to secure a site in the narrow and rugged glens, permitting of a good village layout. Consequently house-building tends to take the form of small community groups, placed near the high road within a mile or two of an existing village. A good example of this arrangement is found at Loch Ard Forest in Perthshire, where five such groups — Braeval, Balleich, Corrie, Renagour, and Kinlochard, have been constructed within a few miles of Aberfoyle, the central township. In the Argyll National Forest Park, groups of houses have been built to serve Benmore, Glenbranter and Glenfinart Forests, some being of prefabricated timber construction. These were brought over in sections from Sweden, and have proved fully satisfactory, despite the exceptionally high local rainfall, which sometimes

reaches 100 inches (250 centimeters) a year. Similar schemes are going forward throughout the Highland Counties, and at some of the remoter forests they may well prove the key to the utilization of land that has long lain idle. For example, at Dalavich, on the western shore of Loch Awe in Argyll, a new group of thirty-one houses provides labor for Inverliever and Inverinan Forests in a region far removed from older settlements, at a point accessible only by water or over many miles of inferior roads, the nearest town, Oban, being thirty miles distant.

Why forest villages are built

The conception of the forest village i[illegible] belief that the worker, and his family, must be s[illegible] factorily housed close to the forest which will gi[illegible] him employment, and be provided with reasonable soci[illegible] amenities. Only in this way can the labor forc[illegible] necessary to work the forests be built up and the drift from the countryside to the towns averted. A stable and contented labor force will well repay th[illegible] cost and effort involved.

Sixth Commonwealth Forestry Conference

The Sixth Commonwealth Forestry Conference was held in Canada between 11 August and 13 September 1952. The agenda for the meetings were prepared by the Standing Committee on Commonwealth Forestry in London, after consultation with forest authorities throughout the Commonwealth. The Canadian Committee in Ottawa was under the chairmanship of D. A. Macdonald, Director, Forestry Branch, Department of Resources and Development of Canada, who also served as chairman of the conference.

The conference opened in the Senate Chamber of the Dominion Parliament, Ottawa, with a full-scale review of official statements on the forestry situation throughout the Commonwealth. Particular emphasis was laid on progress in the last five years on items regarded by the preceding conference as of particular importance. This produced much interesting statistical and technical material over a wide range of forestry subjects. Throughout the conference special emphasis was laid on forest utilization, many topics — such as sustained yield, pulp and paper developments, silvicultural practices and harvesting and manufacturing methods — being considered with particular reference to their relationships to this subject.

Total attendance at the sessions was between 90 and 100 delegates, over half of them from overseas, and including official observers from the United States and FAO.

The conference proper included tours through the provinces of Quebec and Ontario; among the highlights were visits to the Duchesnay Ranger School and the Forest School of Laval University, the Laurentide Park, Price Bros. mill at Kenogami, the Seed Plant at Angus and the Midhurst Nursery, as well as several days under canvas at Lake Opeongo, Ontario. During the Ontario trip there was a very impressive and stimulating parade of organization, methods and equipment, including airplane patrol and transport now used to detect and combat forest fires in this province. Throughout the trip the delegates were indebted for many courtesies to the Provincial Department of Lands and Forests and representatives of the forest industries. The trips afforded delegates an excellent opportunity to observe forest conditions in eastern Canada and the progress being made in forest protection and management, the wealth of forest industries, and the large and growing program in both basic and applied forest research. Following the conference a special tour was arranged for overseas delegates throughout British Columbia by the Provincial Department of Lands and Forests, which afforded a similar opportunity to see forest conditions and practices in this extremely active and interesting area.

Roy Robinson, 1883-1952

Lord Robinson, chairman of the United Kingdom Forestry Commissioners, whose death occurred while attending the Sixth Commonwealth Forestry Conference at Ottawa, Canada, was a man who devoted his life to the cause of forestry in Great Britain, bringing to the task silvicultural knowledge and experience of a very high order. An Australian, Lord Robinson has been described as the Commonwealth's No. 1 forester. He was educated in Australia and was later a Rhodes Scholar at Oxford, where he obtained first class honors in Natural Science in 1908.

After serving with the Board of Agriculture and Fisheries, he was appointed Technical Commissioner on the formation of the Forestry Commission in 1919 and served in that capacity until 1932, being also vice-chairman of the Commission from 1929 to 1932. In the latter year he was appointed Chairman of the Forestry Commissioners, holding, from 1945 to 1947, the additional office of Director-General of the Forestry Commission.

Largely under Lord Robinson's guidance the Forestry Commission in the United Kingdom has grown to an organization which, as the State forest authority, now manages about a million and a half acres of land and has formed to date more than a thousand square miles of new forests in Britain. The National Forest Parks were his creation, intended to provide places of beauty and popular resort, and will remain his real monument — both of which are illustrated in this issue of *Unasylva* — Kielder and Thetford Chase, to mention only two.

Lord Robinson speaking at the Sixth Commonwealth Forestry Conference, very shortly before his death.

It is of interest that at Inverliever, in Argyll, Scotland, there is a Sitka spruce planted 37 years ago by Roy Robinson — then a junior officer in the Department of Woods and Forests. Today it stands 102 feet high and contains 116 cubic feet of timber — and there are others in the same forest which are comparable. It is given to few in forestry to see such swift results of their efforts.

* * *

It has been announced that the Earl of Radnor has been appointed Chairman of the Forestry Commission in succession to the late Lord Robinson. Lord Radnor was appointed a Forestry Commissioner in 1942 and has been acting as Deputy Chairman of the Commission since July, 1951.

Afforestation Techniques in Cyprus

by G. W. CHAPMAN,
Conservator of Forests, Cyprus

ACTIVE interest in afforestation in Cyprus dates from the British occupation in 1878. Immediate steps were then taken to conserve the remaining natural forests and to supplement these natural resources by the plantation of exotic species in the arid, treeless plains. Species of the genus *Eucalyptus* were among the first to be introduced and, subsequently, many other suitable and unsuitable exotics were tried. From time to time, increased funds were allotted for afforestation, and the history of forestry in Cyprus is marked by periodic intensifications in the effort to afforest bare lands. The most recent of such upsurges began in 1941 under the stimulus of subsidies granted under the terms of the United Kingdom Colonial Development and Welfare Act. The program has since been well sustained under the provisions of the Ten-Year Development Plan initiated in 1946.

All through the history of forestry in Cyprus the continuing struggle to rid the forests of free-range goat grazing has been a constant and prominent feature. Within quite recent years, however, the Forest Service has succeeded in ridding 90 percent of the main forests of goat grazing. This has enabled afforestation work to go ahead freed from the constant menace of the flocks, which in the past have done so much to impede or to undo the work of afforestation.

In the village lands free-range grazing is still a serious deterrent factor to the spread of tree-planting enterprise, but here too the situation is now much improved. Roughly half the total area of cultivated land in Cyprus has already been liberated from the free-ranging goat as a result of the operation of the Goat (Exclusion) Law and the Village Tree Planting Areas Law. Under the provisions of these Laws the inhabitants of a village may arrange by majority vote either to exclude the free-range goat entirely from the village lands or to exclude all grazing from a section of the area. As a result, increasing afforestation work is being carried out by peasant smallholders, mostly in the form of small plantations, wind-breaks or groups of trees.

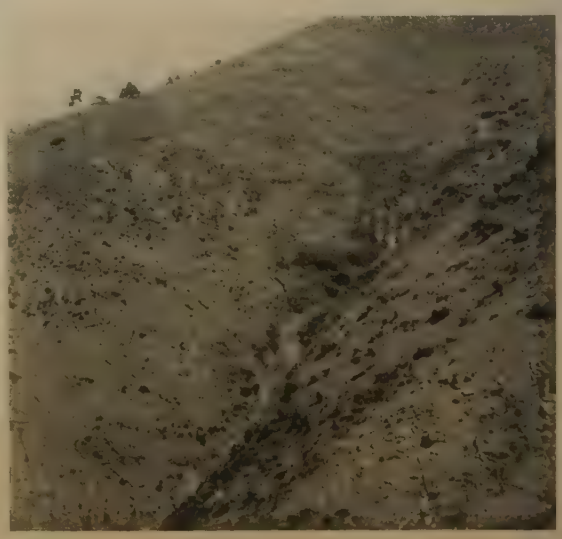
The other important factor relating to the development of afforestation in Cyprus has been the increasing availability of tractors and heavy implements since the end of World War II. Mechanization has done much to revolutionize afforestation techniques, especially in the plains, and the process of adaptation to mechanized afforestation holds promise of considerable future development.

It is the purpose here to describe briefly the most recent developments in afforestation techniques in the mountains and in the plains of the country. As in all Mediterranean countries, the problem of bringing a young plantation through the dry hot summer months of the two first critical years of its life is the main natural difficulty with which we have to contend. In Cyprus, water for summer irrigation is scarce and costly and concentration must therefore be on dry-land techniques. The answer to the problem would seem to be in deep and frequent cultivation, which is referred to again later in this article.

AFFORESTATION IN THE MOUNTAIN FORESTS

In the mountain forests of Cyprus, where *Pinus brutia* and *Cupressus sempervirens* are the principal species, barely on-third of the area is satisfactorily stocked with trees. In the remaining two-thirds the forest is understocked or has been denuded of tree growth by forest fires. Now that forest grazing has been eliminated, it is expected that natural regeneration will in most cases restore the stocking without the intervention of man. Artificial afforestation is limited, therefore, to those areas where active erosion or the tardiness of natural re-seeding for one reason or another prompts the necessity for measures to augment and to reinforce the processes of natural recovery.

At first, the *gradoni* system found favor and was extensively employed, but as time went on the shrubby *garigue* vegetation recovered to such an extent following its release from grazing, that erosion ceased to become a serious problem. This lead to a greater development



Typical of much of the mountain land in Cyprus is this hillside, devastated by fire and continuous grazing by goats. Such a slope is ripe for erosion under these conditions.

As described in this article, gradoni *terracing has been one of the main means of establishing new forests in the Cyprus mountains. Such a terraced hillside is seen at the top of this page, while directly above is a close-up view of a newly established row of seedling pines on one of the terrace banks.*

of the contour cultivated strip system which is now much in vogue. The gradoni system is employed, in combination with the contour strip, only on sites where the steepness of slope or the risk of erosion make this extra and more costly precaution necessary.

At present, contour cultivated strips are cleared to widths varying from 2 to 2.5 meters with uncleared intervals about 5 meters wide. This spacing has been found adequate to prevent accelerated erosion from the cultivated strips. A minimum width of 2 meters in the cultivated strip has been found necessary in order to safeguard the new seedling against competition from the flanking maquis. For the most part, the mountain slopes are too steep to permit the use of tractors, so that almost all the clearing and cultivation must be done by hand. Clean cultivation in the strip to a depth of 15 centimeters has proved of vital importance to the survival of seedlings. In areas where the soil is limited to pockets or the slopes are interrupted by frequent outcrops of rock and boulders, patch cultivation on a chequer-board pattern replaces the contour strip system, but both in effect involve about 30 percent clearance of the ground and therefore work out about the same in cost.

The cultivated strips are sown broadcast in January to March at the rate of 6 kilos per hectare (pine), and the seed lightly covered by raking. In the following winter any failures are raked over and resown; this is repeated if necessary for a third season, though usually repair sowing rarely exceeds 15 percent of the area originally treated. Even so failures can nearly always be traced to inadequate cultivation or to the use of seed which for one reason or another has

Terracing such as that shown in page 161 has in some areas of Cyprus been abandoned in favor of the use of contour strips. Above is a typical hillside, where strips and patches along the contour have been cleared for the establishment of the future forest, giving the hillside a curious pattern. Below is a close-up of seedling pines on the contour strips, amid the ruins of the old forest.

To prevent the gullying which results once erosion has started seriously, stone wall "stops" are built across the gullies. In these, collect debris and eroded soil and stones, which gradually fill the gully again and also prevent further erosion lower down.

lost its viability. Sometimes, however, migrations of birds, mostly finches, are responsible for severe damage in limited areas: late germinations are for this reason often more successful than those in areas sown earlier in the season.

In areas where the erosion hazard necessitates the incorporation of gradoni or contour trenching, these are excavated on the contour at vertical intervals varying from 6 to 20 meters depending on the grade of slope and on the paucity of the ground cover. In almost all cases in our experience the gradoni have given adequate absorption with complete erosion control. Sowing is carried out in cultivated strips immediately below the gradoni. A more recent innovation has been the construction of varying grade trenches designed to discharge surplus rainwater from erosion inland into existing torrent courses, whence the run-off is controlled by stone terrace gully plugging and at lower elevations by the diversion and spreading of water on land where conditions allow for a higher absorption rate.

In the mountain forests afforestation by planting is seldom used, partly on account of higher cost, but mainly because *Pinus brutia* does not transplant easily. Planting is, therefore, restricted to hardwood species, such as *Robinia pseudacacia*, walnut, chestnut and poplars, pit-planted in the narrow riverine sites bordering the mountain streams.

With large blank areas still awaiting afforestation, and with a limited financial provision, the question of keeping down costs is always a matter of importance. For this reason dry stone wall terracing on open slopes is never used in forest land and even *gradoni*, which cost around £40 a hectare, are applied only when unavoidable. Contour strip cultivation at present costs on an average £26 a hectare inclu[illegible] and cost of seed. Present day labor [illegible] £0.45 per man/day.

Afforestation Techniques in the Lowlands

The plain areas in Cyprus are almost wholely under cultivation and the land available for forestry is accordingly very limited. Even those lands which have been secured for afforestation have become so degraded as to be unfit almost for the hardy goat. The general attitude of the people is that when a piece of land becomes useless for any other conceivable purpose, then it may be taken over for afforestation. The lands so acquired, however, consist of many varied types, each offering their own particular problems. There are marsh lands — more often than not saline; there are drift sands; there are eroded slopes more rock than soil; but now and again there are pieces of marginal or worn-out agricultural land which produce excellent crops of eucalyptus. Grazing is still a problem in many of these areas and climatic conditions are severe. Rainfall varies between 250 to 450 mm. per annum and away from the coastal zones the aridity in summer produces semi-desert conditions. Apart from grazing, the main problem of afforestation work in the plains has been that of bringing the new plantations safely through the long summer drought.

Choice of species

During the last seventy years many exotic species have been tried and by this time a good measure of experience has been gained regarding the minimum site requirements of those species which have become established. The most commonly planted of these are listed below grouped according to sites:

Marsh lands. *Eucalyptus camaldulensis* (*rostrata*), *E. umbellata* (*tereticornis*), *E. gomphocephalos*, *E. occidentalis* — and less frequently *E. sideroxylon*, *E. hemiphloia* and *E. saligna*. Of the above, *E. occidentalis* and *E. gomphocephalos* are the most tolerant of saline conditions: *E. camaldulensis* and *E. saligna* the least susceptible to damage by inundation. *Acacia cyanophylla* is used on the more saline sites and exhibits a salt tolerance equalled only by *E. occidentalis*. *Tamarix articulata* (the straight growing Arabian strain) has recently been introduced and shows promise. *Casuarina equisetifolia* is also sometimes grown.

Sand-drifts. *Acacia cyanophylla* has shown itself to be the best pioneer species for sand fixation work. On fixed sands *Pinus pinea* is now commonly planted or sown, being preferred to *Pinus brutia* on account of its straighter growth and resistance to wind damage.

Dry hill-slopes in the plains. These consist commonly of calcarious shales, where erosion is more or less chronic. Here again *Acacia cyanophylla* (and more rarely *A. cyclops*) has been the favorite species on account of its hardiness, tolerance of poor conditions and relatively quick yields of fuel. *Pinus brutia* and *Cupressus sempervirens* (for strongly alkaline soils) are hardy slow growing, while *Eucalyptus occidentalis* and *E. hemiphloia* are now being increasingly used on poor sites.

In the Cyprus lowlands, Eucalyptus, so successful in many other parts of the Mediterranean region, has been well established. This view of a typical plantation shows how well the trees do under suitable conditions. Eucalyptus culture is described in some detail in this article.

Kavkalla sites. The name is derived from the Greek work meaning "crust" and is used to designate bare, flat exposures of soft pleistocene limestones carrying shallow or pocket soils of "terra rossa" character. They are a common feature of the topography of the central plain of Cyprus. Kavkalla sites are frequently set aside for afforestation as village wood-lots, but cannot support more than a poor growth of Acacia. When, however, the crust is cracked to allow root penetration to the moister, underlying chalky-clays, almost any of the trees planted in Cyprus will thrive well.

Botton land sites. These are found usually on former agricultural lands which have been rendered uncultivable by gully formation or sheet erosion. They offer the best sites for afforestation available in the lowland areas. *Eucalyptus camaldulensis, E. umbellata* and *E. gomphocephalos* are the species most commonly planted on these sites.

Afforestation Techniques

Pit-planting

In former days pit-planting without any other preparation of the site was invariably employed. The seedlings were planted out as soon as possible after the first winter rains had fallen and the plants had to be watered through the summer for at least two seasons. Pit-planting is now only used where mechanized preparation of the site is impossible. Even so, some preparation of the site with a pick-axe or mattock is commonly used before pit-planting.

Clean cultivation

On all sites where it is possible to use machinery, the current system is to clean plow the land once or twice during summer and, at the same time, to protect the site from erosion by building earth-banks on the contour. Crawler tractors with bulldozers are used where necessary for rough levelling to fill in gullies to facilitate ploughing. In the autumn the land is disc-harrowed and pits prepared ready for planting. The post-hole digger operated from the tractor's power take-off has proved most satisfactory for making the pits, but when not available, an economical alternative method on level ground is to open a deep furrow (40 cm.) with a "Ditcher" double-wing plow and to plant the seedlings in the furrow. After planting, the area is once more disc-harrowed in February or March to kill weed growth and to provide a good mulch against the summer drought. For the second and third seasons after this, the area is gain disc-harrowed — once in the autumn before the onset of the rainy weather and once in the spring. In marshy land where reed growth offers serious competition to the young trees, regular cultivation with the harrow continues for as long as it is possible to get a tractor between the rows of trees. As a result of this clean cultivation system, no irrigation is necessary, as the spring cultivation gives a surface mulch which reduces soil evaporation losses and preserves soil moisture sufficient for the young trees, so that even in abnormally dry years casualities in new plantations rarely exceed 5 percent.

Experience has proved that much better results are obtained by using pot plants as opposed to transplants from nursery beds. Importance is also attached to the grading of nursery stock because it has been shown that a strong and well-developed seedling grows into a healthy well-formed tree.

Under clean cultivation systems spacing is determined primarily by the width of the tractor and machinery. In Cyprus, eucalypts and acacias are planted at a spacing of 3 x 3m. or 3.5 x 3.5m. Thinnings are rarely made in Eucalyptus crops and usually the plantation is clear-felled on a rotation of 10 years. In subsequent coppice rotations, which may vary from 5 to 10 years, thinning of the coppice sprouts is carried out in the third and fifth years reducing the stems to one or two per stool. In the case of conifer plantation 3 x 3m. is the spacing most generally used.

On some of the Kavkalla sites, where there is a continuous soil cover not less than 10-15 cm. in depth, it has been found possible to afforest the area by disc-harrowing the land once or twice, followed by broadcast sowing of acacia at the time of the final cultivation in the spring. This method has proved very cheap and a highly successful method of establishing acacia: its main drawback is the too close and irregular distribution of the plants.

Some idea of the very difficult conditions under which the administration is attempting to re-establish the forests of Cyprus may be gathered from the photograph above. The utterly bare, eroded hillside, maintained in this terrible condition by free-ranging goats, has been prepared for reclamation by planting Acacia cyanophylla, *a species very suitable for this type of area.*

Sheep Grazing Combined with Eucalyptus Culture

Most of the opposition to lowland afforestation projects comes from the shepherds who resent the extension of plantation work within the village lands as they fear that this will reduce the extent of grazing range. With the object of finding a satisfactory means of neutralizing this hostility, investigations are now in progress to study the possibilities of integrating animal husbandry (sheep and cattle only) with eucalyptus culture.

It has been observed that as a result of changed micro-climatic conditions under the canopy of the plantations, a richer growth of grasses and weeds occur than in similar unplanted areas. This improved fodder production has naturally enough not passed unnoticed by the shepherds who have been glad to pasture their flocks in the spring under the eucalypts. In 1951 winter rains were abnormally low and shepherds were prepared to give as much as £38 per hectare for 20 days grazing in the plantations. Such prices cannot of course be expected in a normal year, and in fact, following exceptionally good rains in 1951/52 winter, grazing everywhere was plentiful so that plantation grazing in the same area this year only fetched £2 per hectare.

Experiments are now being carried a stage further. Experimental plots have been laid out in some recent Eucalyptus plantations at Athalassa near Nicosia, to investigate the possibilities of a systematic integration of pasturage and forestry. During the first two or three years of the plantation's life the trees are too small to safely permit grazing by animals. In this period a leguminous fodder crop is grown between the tree rows. This is harvested for hay and seed production. Once the plantation trees are tall enough to be safe from grazing damage a fodder grass crop will be sown between the rows at the time of the last cultivation and, thereafter, the grass will be cropped off annually, until such time as the growing plantation suppresses all undergrowth. This stage, however, is unlikely to be reached under the short rotations which are the general rule in Cyprus.

If these investigations fulfill the promise of the first two years, we believe that much of the present opposition to afforestation work in the villages of the plains will lose its thunder: the trees themselves will benefit by the application of manure and artificials (applied for the pulse crops) and the economic yields of the plantations will be enhanced by the value of the grazing produced.

A typical forest railway in Yugoslavia in the Foca region. Mature trees have been felled, leaving a pole crop of natural beech.

The Forest Products of Yugoslavia

By C. W. Scott
Lately of the Forest Products Laboratory,
Princes Risborough, England

YUGOSLAVIA has good reason to prize and be prond of her forest products. They are one of her greatest assets, both for internal consumption and export. After the ravages of World War II these products were invaluable in the rebuilding of the country, literally and directly as housing, fuel, railway sleepers and other internal assets, and also as exports to countries in great need of wood and prepared to pay for it with funds urgently wanted by Yugoslavia. Before the war, timber made up only 15 percent of the country's total exports, but in 1950 it had risen to 33 percent and in 1951 amounted to 30 percent by value. Moreover, timber and wood products were the chief item of Yugoslavia's total exports to her best customer, the United Kingdom, in the critical years 1949-1951, being 78 percent by value in 1949, 74 percent in 1950 and 66.5 percent in 1951.

Chief timbers

Yugoslavia's hardwoods have long been famous, particularly the Slavonian oak of the Danubian plain which has qualities of special value in the highest class of decorative building; the trees and logs are often of superb size and shape. Very valuable decorative veneers are sliced from it, in addition to boards, planks and parquet flooring. Yugoslav beech, too, is deservedly famous for quality and soundness, and is esteemed for the many uses to which this excellent species lends itself. Ash and walnut are other valuable woods, and poplar, growing freely and fast, is also a useful species.

The softwoods of Yugoslavia are more of a novelty in western Europe but have played a very useful part in recent years when supplies from the usual sources were not available. Silver fir (*Abies alba*) is the chief species and grows to a majestic size, providing wide boards of prime quality, with relatively few knots. Common spruce of good quality is another major softwood, and there is considerable pine, both of the *nigra* group, to which Austrian and Corsican pine belong, and of the ordinary species, *sylvestris*, the Scots pine or redwood of northern Europe. The growing needs of southern Europe and the Middle East, for the most part poor in conifer forests, are likely to absorb all the softwood which Yugoslavia can spare for many years to come.

Distribution of total timber production in the country

Yugoslavia is a federation of six republics which differ greatly in their topography as well as in their climate and forest resources. The following are rough figures of the current volume of timber production by each of the republics, as percentages of total production.

Percentage of total production, by volume

	Bosnia	Croatia	Slovenia	Serbia	Crna Gora (Montenegro)	Macedonia	
Hardwoods	30	30	9	16	9	6	100
Softwoods	*43*	*13*	*25*	*5*	*11*	*3*	*100*
Total .	36	24	13	12	8	7	100

Some features of the chief producing areas

The figures given above show that Bosnia and Croatia together produce about 60 percent of the total timber, and Bosnia alone produces over 40 percent of the total softwoods. In the center and south of Bosnia there are great hitherto unworked conifer forests which are now in the process of being opened up for timber extraction. Some of these forests grow on very steep mountains and present formidable problems to logging and transport engineers. Crna Gora (Montenegro) is similar in general character but very much smaller in area.

Croatia has a long tradition of intensive working of its hardwoods, especially the superb Slavonian oak of its north-eastern plains, while its mountainous western region holds much softwood and beech, on steep ground similar to that of Bosnia. The republic of Slovenia, in the extreme north-west of Yugoslavia, adjoining Austria, is an alpine region of great beauty. (It is apt to be confused with that part of the Danubian plain known as Slavonia, the home of the best oak in Croatia, but not a political unit.) Slovenia is second only to Bosnia in softwood production, but the average size of its trees is smaller than those of the latter's virgin forests.

The forests of Serbia and Macedonia have suffered centuries of overcutting and overgrazing under foreign rule, but they nevertheless contribute materially to Yugoslavia's total timber output, especially Serbia on account of its large area. Their future potential, under skilful tending and improvement, is great.

Developing forest roads

Yugoslavia's annual report for 1950 on its forestry and forest products, made to FAO, gives some figures of the great development of forest roads in the country. Before 1939-45, there were 1,550 miles of light railways and only 465 miles of truck or lorry roads in the forests. Since 1939-45, the figures are 930 miles for light railways and 2,170 miles for truck or lorry roads.

The tendency of much of the limestone terrain to form abrupt basin-like hollows or depressions favors roads rather than railways, though the latter have their

particular uses. The report estimates that 2,480 miles (4,000 km.) of communications are still needed in the forests: and it is evident in the mountain areas, such as southern Bosnia, that there is an urgent need for skilful local development of ropeways or other economical mechanical means of handling large logs on very steep slopes. At present extraction to logging railway or truck road is mainly by dragging, by horses, tractors or winches, with some use of skidders and ropeways.

The manufacture of forest products from logs

Before World War II, the manufacture of Yugoslav forest products from logs was confined mainly to sawmilling, even where the log was processed at all and not sold in the round. Since the end of the war a great change has taken place and is continuing. This must be deemed all the more creditable when it is realised that during 1941-45 some 67 percent of the whole manufacturing power of the timber industry was gravely damaged or destroyed. Inevitably in these circumstances there has had to be improvisation, and mistakes have occurred which are now being rectified.

An exception to this general picture of conditions before 1939 was the Slavonian oak and beech forests of eastern Croatia, on the Danubian plain. In that rich and valuable area there have been for many decades several large centers of well-integrated manufacture. Such a center has usually embraced a good sawmill, using relatively slow but accurate frame-saws, a parquet flooring factory, a cooperage, a tannin factory producing oak tannin extract, and a dry distillation plant producing the usual range of useful chemicals from the oak and beech on which it operates.

In some cases seasoning kilns were used, with success; but the more leisurely pace formerly possible allowed much to be done quite satisfactorily by air seasoning. Kiln seasoning, of course, offers quicker and equally good or even better results, provided it is properly applied in kilns suited to the type of timber to be dried, controlled by competent operators.

Today, in Yugoslavia as elsewhere, great efforts are being made to extend manufacture of forest products as far as possible in the country of origin, so as to make a better profit from the log and provide more skilled employment in the producing country. The transformation needs time, both to gain experience and to train skilled labor; but the current is strong and not likely to be checked or reversed.

Numbers of new centers of integrated manufacture are being set up, with better machinery than in the old ones, and nearer to the species used in forests not hitherto worked or at least not exhausted. The new centers included furniture factories, with considerable attention to the making or use of bentwood, blockboard, plywood and veneer. There is also much interest in the making of prefabricated houses. Moreover, at Rijeka (formerly Fiume), on the Adriatic, there are two factories producing excellent beech plywood for internal demand and export, with casein or synthetic resin glues, as required. One large factory in Slovenia is producing hardboard, and at least one other similar factory is under construction in Bosnia. In the important field of utilization of waste or surplus wood as fiberboard, compressed fuel or otherwise, Yugoslavia has the advice of a leading expert from Canada.[1]

In the Slavonian oak area of Croatia there is an old and highly skilled center of sliced veneer production. In spite of its antiquated machinery, this center makes valuable veneer from the superb oak on which it operates. When better equipment becomes available, still better results can be expected, and will extend to the walnut which occurs in the country, both for Yugoslavia's own furniture factories and for export.

Of all the wood cut in 1949 only 3.6 percent was made into paper pulp or wood flour. Yugoslavia's own needs in paper are estimated to require the raising of this figure to 20 percent, if the economics of such production justify this development, a matter complicated by many factors.

Sustained supplies of trees for sawmills and wood factories.

Sustained supplies, or sustained yield as foresters say, are as vital to a timber industry and to the maintenance of profitable exports as to the foresters responsible for efficient forest management. This question is much in the minds of the authorities in Yugoslavia. Past neglect of forestry and absence of commonsense measures over many decades, or even centuries, in some of the lands which now form Yugoslavia, cannot be put right quickly or easily. Moreover, after the war of 1939-45 it was essential to rebuild the country and set it on its feet, whatever trees had to be felled in the process. This is recognized, and great efforts are now being made to right the situation and reach a sustained yield basis.

The 1950 report to FAO already quoted gives much information on this subject. A forest inventory of 1946-48 gave the following main results: 33,500 sq. miles (8.7 million hectares) were under forest, 33 percent of the total area of the country. Of this forest area there were 22,000 sq. miles (5.7 million hectares) under productive forest, 5,900 sq. miles (1.5 million hectares) under poor coppice, requiring rehabilitation by tending, and 5,900 sq. miles (1.5 million hectares) denuded of trees and requiring replanting or seeding. The silvicultural problem of the denuded areas is most difficult in the poor limestone or karst areas with a low uncertain rainfall, grazing pressure and other adverse factors, and the problem is receiving particular attention. The converse is true in other and more favorable areas where only protection of the abundant natural regeneration is necessary.

Better utilization can contribute greatly towards the same objective of sustained yield or continuous supplies of trees; for such utilization means less waste, ability to use a lower grade or smaller size of tree, and longer life from sleepers (ties), posts, poles and woodwork generally, by effective wood preservation.

Forest products research to promote better use of wood

Yugoslavia has long had distinguished workers in forestry and forest products, notably in her univer-

[1] He operates under the agreement between Yugoslavia and FAO providing for visits by some nine experts, of whom five are concerned with forest products, and for sending abroad some 26 Yugoslav technicians to study under FAO fellowships.

sities. Since 1945 the facilities for research in these subjects have been increasing rapidly, both at the universities and at special research institutes set up by the State. In 1949 a forest products research center or Institut du Bois was established at Zagreb, the capital of Croatia, primarily to serve that republic. It has done praiseworthy research, notably on timber grading, but perforce much of its time has been spent up to now on executive or semi-executive work for the Government of Croatia in connection with logging, sawmilling and machinery of many kinds.

A new role is now proposed for this institute, namely that it should serve as the main or only forest products research center for the whole of Yugoslavia, with branches and liaison staff in other parts of the country, as necessary. In this matter the advice of FAO has been sought and embodied in a detailed report which is now under consideration. Without anticipating that report or the decisions to be taken on it by Yugoslavia, the following brief outline may be given of some of the practical problems on which it is clear that work is necessary.

Practical problems needing solution

In kiln seasoning there is a need for training facilities for kiln operators, and for improved kiln designs. In timber mechanics and silvicultural relations (as understood in the U.S.A.) there is a long standing need for testing machines capable of giving strength data acceptable and comparable in international trade and research work. As beech is one of the country's chief hardwoods and is a very perishable species out of doors or when wet, there is vital work to be done on wood preservation; such work is one of the ways by which the existing supplies of beech can be better utilized, by increasing the useful life of the wood, whether as sleepers (ties), pitprops or building timber. In forest exploitation or logging there are urgent problems of economical extraction from steep mountains, by suitable machinery. Band saw maintenance and the greater mechanization of sawmills are important in the woodworking field, and so are the machinery and methods for bending beech, oak and ash in furniture and other products. Plywood, veneers and fiberboard are becoming increasingly important for internal needs or export, and the many existing improvements in making and using these products throughout the world require testing for their suitability in Yugoslavia.

Importance of documentation and liaison work

Finally, documentation is vital, if only to keep abreast of the great volume of research in progress in other parts of the world, and to avoid wasting time and money at Zagreb on problems already solved elsewhere. Economics and statistics too, in their proper place, are esential studies in a modern research center such as is proposed.

Experience suggests that in Yugoslavia as elsewhere nothing is more important than adequate liaison, and that this liaison should cover in particular the following major fields; liaison between research and industry, or the laboratory and the factory; between forestry and forest products, or the growing and the using of trees; between university research workers and the staff of the State research centers, such as the Institut du Bois. Finally, there must be close liaison between the country as a whole and all others in which research is in progress, by links such as are provided or encouraged by recognized international organizations.

Commodity Report

Sawnwood

Sawn Softwood

The world-wide boom in raw materials and consumer goods during 1950 and early 1951 which was caused by fears of an extension of the Korean war, had a stimulating effect also on world sawnwood production and trade. By the end of 1950, stockpiling and speeding up of defence programs in most countries had already necessitated greatly increased supplies of sawnwood, either from domestic production (Table 1) or imports (Table 3). The only important country where the development during 1950 was contrary to the general trend was the United Kingdom, which for economic reasons had to heavily curtail its imports of sawnwood, and consequently the level of supplies in that country at the end of 1950 was considered to be dangerously low. The general decline in demand for raw materials in the early months of 1951, however, led to a marked fall in the prices of most commodities, which in the summer of 1951 spread to consumer goods. It would reasonably have been expected that there would be a decline in the demand for sawn softwood with falling prices and a break in the boom. But in fact this happened only in the United States, where demand fell sharply and led to a general though small decrease in prices. Elsewhere developments on the sawn softwood market moved in the opposite direction. The improved balance of payments position of the sterling area and the low level of sawnwood stocks led the United Kingdom to make large-scale purchases of sawn softwood during the second half of 1950 and in early 1951, in order to replenish its stocks and at the same time to build up a strategic reserve. Of the Commonwealth countries Australia and South Africa followed this purchasing campaign. Thus, the increased demand from the sterling area for sawn softwood was more than enough to compensate for the decline elsewhere making possible the continuation of the boom almost to the end of 1951. The world market for sawn softwood in 1951 was therefore characterized by two distinctly opposite developments: on one hand, the declining demand and resulting fall in prices in the United States, and on the other, increasing demand and rising prices in Europe In Europe particularly the large-scale purchasing by the United Kingdom from that continent as well as from other sources created fears in the other importing countries that their requirements for 1951, although lower than in 1950, might not be met. This led to competition between the United Kingdom and the other importing countries for existing supplies in the exporting countries, with the result that prices in Europe rose during the course of 1951 to unprecedented levels. The decline in demand in the United States and the high prices paid for sawn softwood in Europe also led to substantial quantities being sold to Europe by North America, notably by Canada to the United Kingdom.

The extraordinary rise of sawn softwood prices together with the already weakened demand from consumers in most of the importing countries caused a growing resistance of buyers and consumers to the high prices at the end of 1951; such high prices seemed seriously to endanger the consumption of sawn softwood as raw material. Moreover, the adverse development of the sterling exchange situation was an additional inducement to the United Kingdom to revise its former buying policy and substantially reduce the volume of its timber imports. All these factors combine to produce an almost complete stagnation on the sawn softwood market in Europe, and in the consequent "war on prices" during the first four or five months of 1952, the position of the buyers was strengthened by the high level of sawn softwood stocks in most of the importing countries. In the late autumn of 1951 the United Kingdom had already announced its plans to cut drastically its imports in 1952 and other countries were, in general, expected to follow this example. The sellers' position had already become difficult at the beginning of 1952 because of the excessive prices paid for raw material in the autumn and winter of 1951, especially in the northern European countries. In the absence of any large purchasing for 1952, and in spite of heavy cuts in production, more and more sawmills in the exporting countries were menaced by financial difficulties, and the need of ready cash in order to finance current operations became increasingly apparent. Smaller sawmills were the first to cede, but the level of prices, in general, was maintained until May 1952 when the prices fell drastically by some 25 to 35 percent, and in some cases even more. From June 1952, onward, the market revived a little, but the volume sold or to be sold in Europe in 1952, or for delivery in 1952, seems to remain at a considerably lower level than in 1951.

Europe.

The reasons given above for the changes in the European sawn softwood market from 1950 onwards explain, in general, the course of developments in 1951 and 1952. Within Europe, however, opposite developments could be noticed in different parts of the Continent. As mentioned, the increase in European supplies in 1951 was almost entirely due to the replenishing of stocks by the United Kingdom, which led to a substantial increase in the volume of imports in 1951, although imports by most other countries declined.

TABLE 1. — PRODUCTION OF SAWNWOOD.

	Sawn Softwood				Sawn Hardwood			
	1950	1951	January 1951	June 1952	1950	1951	January 1951	June 1952
	1000 standards				1000 m^3			
North America	18 945	18 279	..	..	18 883	19 583		
of which:								
United States	15 441	14 681	..	..	1 428	1 466	..	..
Canada	3 504	3 598	1 861	1 683	17 405	18 117	758	686
Europe a)	8 388	8 611	4 630	4 150	8 299	8 678	4 220	4 020
of which:								
Austria	568	694	377	352	78	91	57	59
Belgium	50	51	26	26	360	380	190	190
Denmark	60	60	30	30	190	190	120	135
Finland	875	1 055	551	407	47	70	..	..
France	621	663	300	342	2 000	1 900	800	820
Germany, Western	1 679	1 598	837	711	1 017	1 368	713	758
Greece	28	19	..	..	35	31	..	
Ireland	3	4	2	..	12	12	6	
Italy	164	166	..	..	364	410	..	
Luxembourg	3	8	1	1	10	14	7	6
Netherlands	28	28	10	6	167	200	71	62
Norway	330	280	..	..	..	..	..	
Sweden	1 140	1 327	..	..	140	145	..	..
Switzerland	150	173	103	111	90	130	60	40
Turkey	43	35	26	10	28	50	26	23
United Kingdom	53	47	28	29	1 058	962	706	584
Yugoslavia	503	406	431	384	609	595	284	236
South America	520	b) 550	..	..	1 200	b) 1 300	..	
Africa	20	b) 20	..	..	650	b) 700	..	..
Asia	1 820	b) 1 900	..	..	3 800	b) 3 900	..	..
Oceania	290	b) 300	..	..	1 900	b) 1 900	..	..
TOTAL	29 983	29 660			34 682	36 061		

a) Excludes U.S.S.R. and Eastern Germany.
b) Estimated figure.

Production

During 1950/51 increased demand created by the United Kingdom and other countries of the sterling area, and the resulting rise in prices, stimulated European (excluding U.S.S.R.) production of sawn softwood, which rose from 8,388,000 stds. in 1950, to 8,611,000 stds. in 1951 (Table 1). This increase was due entirely to the higher production of the main exporting countries, Austria, Finland and Sweden, whereas the production in other countries either remained unchanged or declined slightly. The fall in demand from the autumn of 1951 onwards appears to have adversely affected the production of the above-mentioned exporting countries only, but figures for the first half of 1952 tend to indicate that the total European production of sawn softwood in 1952 also will remain well below even the 1950 production level. The volume of sawlogs

TABLE 2. — STOCKS OF SAWNWOOD.

	Sawn Softwood				Sawn Hardwood			
	31 December 1950	30 June 1951	31 December 1951	30 June 1952	31 December 1950	30 June 1951	31 December 1951	30 June 1952
	1000 standards				1000 cu. m. (s)			
Western Europe a)	925.7	1 037.1	1 281.0	1 734.0	1 210.2	1 486.5	1 243.7	2 111.7
United States	1 739.9	..	1 938.3	..	2 871.9	..	3 408.2	..
Canada	530.0	536.8	545.1	581.8	224.7	274.9	230.8	297.9

a) Including only: Austria, Belgium, Denmark, France, Western Germany, Greece, Iceland, Ireland, Luxembourg, Netherlands, Switzerland, Turkey, United Kingdom, Yugoslavia.

TABLE 3. — IMPORTS OF SAWNWOOD.

IMPORTS

	Sawn Softwood				Sawn Hardwood			
	1950	1951	January-June		1950	1951	January-June	
			1951	1952			1951	1952
	1000 standards				1000 cu. m. (s)			
Europe	a) 2 300	a) 3 000	b) 920	b) 1 000	c) 1 620	c) 1 580	d) 770	d) 520
of which:								
United Kingdom	800	1 640	562	498	1 180	1 098	520	362
United States	1 597	1 143	..	..	667	617	..	..
Australia	130	202	..	..	23	44	..	..

a) Austria, Belgium-Luxembourg, Denmark, Finland, France, Western Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Portugal, Switzerland, Sweden, Turkey, United Kingdom and figures given by exporting countries for Eastern Germany, Czechoslovakia, Hungary, Poland, U.S.S.R.
b) Austria, Belgium-Luxembourg, Denmark, Finland, France, Western Germany, Iceland, Italy, Netherlands, Norway, Sweden, Switzerland, Turkey, United Kingdom, and figures given by exporting countries for Czechoslovakia, Eastern Germany, Hungary, Poland, U.S.S.R
c) Austria, Belgium-Luxembourg, Denmark, Finland, France, Western Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Sweden, Switzerland, United Kingdom, Turkey and figures given by exporting countries for Czechoslovakia, Eastern Germany, Hungary, Poland.
d) Austria, Belgium-Luxembourg, Denmark, Finland, France, Western Germany, Iceland, Italy, Netherlands, Norway, Sweden, Switzerland, Turkey, United Kingdom and figures given by exporting countries for Eastern Germany and Hungary.

felled during the season 1951/52 in the principal exporting countries was reported to have been substantially lower than in the previous season, and it would therefore appear unlikely that production in 1953 could attain the high figure recorded for 1951, even should there be a more pronounced rise in the European demand for sawn softwood during that year.

Consumption and Stocks

The consumption of sawn softwood in Europe during 1951, on the basis of given stock figures at different periods, seems in most countries to have shown a slight but continuous decline since the summer of 1951. The cause of this decline appears to have been partly the more severe building restrictions in some countries, and partly, though not to the same extent, the growing resistance of consumers to the high prices of sawn softwood and resultant use of substituting materials. Stocks of sawn softwood in Western Europe (Table 2) therefore rose continuously from the end of 1950, in spite of reduced imports by most countries in 1951 and particularly in the first half of 1952. However, the fall in sawn softwood prices in May 1952, together with expectations of increased building activity during the second half of 1952, and in 1953, both as regards civilian and military construction, have revived hopes of a rise in demand and consumption of sawn softwood; although it is believed that importers in general will not be as eager to rush and buy for 1953 as they were for 1951, because of the satisfactory level of stocks at the end of June 1952.

Imports

Imports of sawn softwood by the reporting European countries, after having risen, in 1951, considerably above the level of 1950, owing to the above-mentioned

TABLE 4. — EXPORTS OF SAWNWOOD.

EXPORTS

	Sawn Softwood				Sawn Hardwood			
	1950	1951	January-June		1950	1951	January-June	
			1951	1952			1951	1952
	1000 standards				1000 cu. m. (s)			
Europe	a) 2 630	a) 2 840	b) 1 020	b) 760	c) 1 190	c) 1 000	d) 510	d) 230
of which:								
Northern Europe	1 486	1 774	511	406	129	84	24	7
Canada	1 854	1 799	873	894	548	426	196	135
United States	195	413	..	..	149	232	..	..

a) Austria, Finland, France, Western Germany, Norway, Portugal, Sweden, Yugoslavia, and figures given by importing countries for Czechoslovakia, Eastern Germany, Poland, Romania, U.S.S.R.
b) Same as (a) minus Portugal.
c) Austria, Belgium-Luxembourg, Denmark, Finland, France, Western Germany, Italy, Ireland, Netherlands, Sweden, Switzerland, Turkey, United Kingdom, Yugoslavia, and figures given by importing countries for Czechoslovakia, Hungary, Poland, Romania, U.S.S.R.
d) Same as (c) minus Ireland and U.S.S.R.

TABLE 5. — SWEDISH WHOLESALE SAWNWOOD PRICES.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	(Kronor per standard f.o.b., Härnösand district)											
2 1/2 in. × 7 in. redwood battens u/s:												
1950	652	671	700	715	750	750	760	770	775	830	1 035	1 050
1951	1 075	1 110	1 180	1 220	1 230	1 235	1 250	1 260	1 260	1 260	1 270	1 325
1952	1 320	1 325	1 285	1 220	1 075	930	925	..	..	..	..	..
2 1/2 in. × 7 in. white-wood battens u/s:												
1950	650	660	675	680	685	685	690	705	710	765	975	1 005
1951	1 045	1 095	1 130	1 170	1 190	1 200	1 200	1 205	1 210	1 205	1 215	1 285
1952	1 290	1 290	1 210	1 165	1 025	875	880	..	..	..	..	..
2 1/2 in. × 7 in. redwood and whitewood fifths:												
1950	580	605	627	640	670	670	675	680	700	730	930	995
1951	995	1 040	1 090	1 140	1 150	1 170	1 175	1 180	1 185	1 180	1 185	1 245
1952	1 240	1 230	1 165	1 180	955	780	775	..	..	..	..	..

stock replenishment by the United Kingdom, sharply declined during the first half of 1952 (Table 3). European imports from overseas countries, which in January-June 1951 had been 261,800 stds. and for the whole year 1951, 508,700 stds., had risen to 326,000 stds. in January-June 1952. This was due to shipments to the United Kingdom from Canada under 1951 contracts being carried out in 1952. Imports by the Western European countries from Eastern Europe and the U.S.S.R. also declined, amounting to 26,800 stds. in the first half of 1952, as against 34,000 stds. in January-June 1951, and 179,300 stds. for the whole year of 1951.

On the other hand, imports by the Eastern European countries from Western Europe, mainly by the U.S.S.R. from Finland, rose markedly, and exceeded the volume of imports by Western European countries from the eastern countries.

Exports

Simultaneously with the increased volume of imports, exports by the reporting European countries rose substantially between 1950 and 1951 (Table 4). Exports to Western Europe increased, and there was a marked rise in the volume of sawn softwood exports to overseas countries and countries in Eastern Europe, in the latter case mainly from Finland. The greatest increase in overseas exports went to the Latin American and Commonwealth countries, and to South Africa in particular. During the first half of 1952, however, there was a sharp decline as regards exports to the Western European and overseas countries, whereas exports to the Eastern European countries, notably by Finland to the U.S.S.R., increased again.

Prices

The gradual rise in prices of sawn softwood during 1951 from some £72 to £75 per std. f.o.b. for 7 inch u/s redwood battens of reputable north European goods to such unprecedented levels as £90 to £93 per std. for sawn softwood of the same dimension and quality was brought to a standstill at the end of 1951, and remained practically unchanged during the first four months of 1952. During this period the weakening of sawn softwood prices became apparent, and the buyers' and consumers' resistance led to a drastic fall in prices of all categories and qualities in May 1952, which varied between 25 and 35 percent and in some cases was even larger. Prices were thus brought down to the level of the last month of 1950, or around £60 to £64 per std. for 7 inch u/s redwood battens of reputable north European goods, and the extraordinary rise which had taken place in 1951 was completely eliminated in one month. Table 5, giving the average export quotations for Swedish sawnwood through 1950/1951 up to August 1952, clearly shows this development. This drop in export prices was further accentuated by a fall in freight rates by some 50 percent of those at the end of 1951. The situation thus became even more favorable for importers.

As regards prices of domestic sawn softwood in the importing countries, the development was not quite the same. At the beginning of 1951, these prices had been substantially below the prices of imported sawn softwood in practically all importing countries, but had gradually risen during the course of 1951, always, however, remaining below those of imported sawn softwood. The weakening demand for imported sawn softwood therefore strengthened the position of home-grown sawnwood in these countries in general, and the fall in the prices of imported sawn softwood in May, 1952, while restoring the competitive position of imported sawnwood to some extent, signified an adjustment of the relationship between the prices of these two categories of sawn softwood to a more reasonable level, rather than any serious weakening of the position of home-grown sawn softwood, although in some cases the prices of the latter declined. Any such changes, however, should be considered to be resulting more from the general uneasiness on the market than from any real necessity for decreasing prices.

NORTH AMERICA

As mentioned earlier, a decline in demand for sawn softwood was already apparent in the United States during the first six months of 1951. This decline was mainly due to the curtailment of housing and general construction. Towards the end of 1951, however, demand strengthened as building activity showed signs of reviving, particularly in respect of public and military construction, and by the summer of 1952 consumption seemed to have reached its previous level. The low level of demand from the United States, the main importer of Canadian sawn softwood, also affected Canadian sawmilling industries. However, Canada was able to compensate for the fall in demand from the United States by increased exports to Europe, particularly to the United Kingdom, and to countries such as Australia and the Union of South Africa.

Production

For the reasons mentioned above, the production of sawn softwood in the United States and Canada together in 1951 was some 3 percent below the level of the 1950 production. This decline in North America's 1951 sawn softwood production was entirely due to a decrease of some 5 percent in the output of sawn softwood in the United States (Table 1).

Consumption and stocks

The decline in consumption in the United States appears to have been stronger than the fall in the output of sawn softwood, and consequently stocks in both the United States and Canada rose during 1951, and at the end of that year they were some 8 percent higher than at the beginning of 1951.

No figures were available for stocks of sawn softwood (Table 2) in the United States at the end of June 1952, but it seems likely that the existing stocks have had to bear the first weight of an increased consumption and may therefore be expected to show some decrease from the level of the beginning of 1952.

Trade

Inasmuch as Canadian exports to the United States markedly declined during 1951, so North American exports of sawn softwood, to the United Kingdom, Europe and other regions, noticeably increased. As mentioned before, this development largely compensated for the reduced consumption in the United States of America. These exports seem also to have been encouraged by the high level of prices on the international sawnwood market, particularly as the prices paid abroad during the latter part of 1951 exceeded those on the home market. Since the end of 1951, the revived demand in the United States seems to have stabilized Canadian exports to that country, and these exports during the first half of 1952 were more or less the same as in the latter half of 1951.

Prices

It has already been pointed out that falling demand in the United States, already apparent towards the end of the first half of 1951, had led to a decline in prices of sawn softwood. Thus the wholesale price for Douglas Fir No. 1, common, 2 inch x 4 inch, R. L. fell from $167 per std. in March 1951 to $164 per std. in June 1951, or by some 2 percent, but since then it seems to have remained rather firm. The corresponding decline in the price of Southern Yellow Pine, No. 1, common, was from $176 per std. to $173.50 per std. Canadian wholesale prices, as given by the Dominion Bureau of Statistics, showed a continuous rise from January 1951 onwards, while the wholesale price index for softwoods seemed more to follow the price movement in the United States. Thus the wholesale mid-month prices of Canadian White Pine, Nos. 1 and 2, 1 inch x 4 inch, in Canadian dollars per M.bd.ft. rose from $128.00 in January 1951 to $140.00 in June 1951, reaching $141.00 by the end of 1951. By May 1952, these prices had risen further, to 155.00, and since then they have remained the same. The corresponding movement in prices of Canadian Spruce, merchantable, 1 inch x 6-7 inch deals, in Canadian dollars per M.bd.ft., was $74.50, 82.25, 82.25 and 85.75. At the same time, the wholesale price index (1935-30=100) for spruce moved from $368.8 in January 1951 to $398.6 in May 1951, falling to $390.7 in December 1951. From January 1952 onwards, however, the index rose again and reached $427.8 in May 1952. The corresponding movement of the wholesale price index for fir was $547.0, 576.8, 570.0 and 531.0. This latter index seems to have been affected mainly by changes in prices of pulpwood for sulphate pulp.

AUSTRALIA

The higher demand in 1951 arising from increased building material requirements for immigration and industrial expansion, together with the favorable balance of payments position of the sterling area, led to the stepping-up of both domestic production and imports of sawn softwood. In fact, Australia's imports of sawn softwood in 1951 reached an all-time high. This increase was reported to be some 55 percent over imports in 1950. The total production of sawn wood, both softwood and hardwoods, in the 1950/51 season, was some 1,234 million super feet (2.9 million cubic meters, and was thus substantially higher than the average prewar production of some 700 million super feet (1.7 million cubic meters). A large part of these imports, mainly from Europe and North America, went to replenish stocks. Towards the end of 1951, the balance of payments situation of the sterling area led Australia, like other Commonwealth countries, to severely curtail its imports for 1952. The supply position for 1952, however, appeared to be fairly satisfactory, as existing stocks of imported sawnwoods were reported to be "far beyond the ability of the building industry to absorb". Furthermore, insects found in some of the imported sawn softwood raised fears of domestic supplies being infected by these insects (*Sirex*) and severe measures were taken to protect home-grown softwoods. In this connection, a decision was made that all sawn softwood to be imported should be steam dried at a certain disinfecting temperature

before shipment, and that an official certificate of such disinfection should be issued by the authorities of the exporting country.

South Africa

The boom on the sawn softwood market in 1951 was also felt in the Union of South Africa, and imports by this country consequently increased. The good supply situation in 1951, however, did not lead to a corresponding increase in consumption. The high prices of sawn softwood had been met by a growing resistance from consumers, and consequently stocks at the end of 1951 were unusually large. This buyer's resistance caused a general uneasiness on the South African sawn softwood market, and many importers were reported to have reduced their resale prices during the first half of 1952. Furthermore, contracting for 1952 which had already been weak towards the end of 1951, came practically to a standstill during the first six months of 1952. As the stocks seemed to be very satisfactory even in the summer of 1952, buyers were rather unwilling to start any large-scale purchasing before they were really in need of new supplies. Certain fears were thus created that some shortage of sawn softwood might be felt during the latter half of 1952. Further developments, however, seem to depend largely on whether or not confidence in the market is regained.

Outlook

The reduced production of sawn softwood in 1952, combined with lower imports and the general uneasiness on the market, seems to indicate that consumption of sawn softwood in most parts of the world throughout this year will be met largely by drawing upon existing stocks, and these in consequence may be expected to be considerably reduced by the end of 1952. As there are signs of increased industrial activity in general and higher building activity, both civilian and military, in 1953, the consequent rise in demand is likely to bring about some increase in new supplies of sawn softwood in 1953, although it is questionable whether the average level of 1950 and 1951 will be attained. The stabilization in sawn softwood prices by the end of the first half of 1952 at a more reasonable level may also induce consumers at least to some extent to revert to wood as a raw material in cases where other materials have recently been increasingly used as substitutes. Although there are no definite data on the major importing countries' import programs for 1953, with the exception of the 500,000 standards freed for import in 1953 by the United Kingdom, it may reasonably be assumed that the volume of sawn softwood trade in 1953 will be higher than that of 1952, but it will probably still be lower than that of 1951, particularly in regard to Europe.

Sawn Hardwood

A similar boom to that on the sawn softwood market in 1951 commenced even earlier on the market for sawn hardwood. Production of sawn hardwood (Table 1) rose in all parts of the world, even in the United States, where the output of sawn softwood had declined. World demand for sawn hardwood was, in general, at a rather high level during the first half of 1951, and consumption also seemed to be rising. In the United States, sawn hardwood was even substituted to some extent for sawn softwood. Towards the end of 1951, however, the general uneasiness on all sawnwood markets had its bearing also on the sawn hardwood market, and demand declined. Consequently stocks (Table 2) in most countries were at a fairly high level by the end of 1951, and business in new supplies for 1952 was reported to be quiet at the turn of the year. These changes in demand for sawn hardwood, however, affected mainly countries in Africa and South Asia, the hardwood trade in these countries being based almost entirely on exports to Europe and North America, and to the United Kingdom particularly. The decline in imports envisaged by the United Kingdom for 1952, arising out of the deterioration of the balance of payments situation and the decreased demand from furniture industries, was therefore expected to bring about a substantial falling off in the volume of production and trade in sawn hardwood in these countries. Sawn hardwood output and trade in North America and Europe, have a more regional character than in Africa and Asia, since most of the sawn hardwood produced is used within these continents, and in many cases even within the producing country itself. Changes in market conditions in other regions consequently have little or no effect on the production and trade in hardwood in these countries.

In the summer of 1952 there were signs of some revival on the sawn hardwood market, although developments still seemed to be behind those for the sawn softwood, and the situation in regard to 1953 was somewhat undefined at the time of writing this report.

The Work of FAO

Latin American Forestry Commission

At the generous invitation of the Government of Argentina, the fourth session of the FAO Latin American Forestry Commission was held at Buenos Aires, 16-23 June, 1952. This was a most successful meeting, bringing together many important personalities in the region. At its conclusion the heads of delegations were graciously received in audience by President Peron.

Previous sessions of this Commission have been held in Brazil, Peru and Chile, and on the present occasion the Commission was invited by the delegate of Venezuela to convene for its fifth session at Merida, the proposed seat of a Latin American Forest Research and Training Institute.

The session was under the chairmanship of Mr. Bianchi Gundian, Inspector-General of Forests, Chile, and countries represented were Argentina, Chile, Colombia, Dominican Republic, France (French Guiana), Honduras, Mexico, Netherlands, Paraguay, United States, Uruguay, and Venezuela. Other representatives were present on behalf of the Holy See, Organization of American States (OAS), Caribbean Commission, Economic Commission for Latin America (ECLA), and International Labour Office. In addition chiefs of FAO technical assistance missions for forestry in Brazil, Chile, Haiti, Honduras, Mexico, and Paraguay, joined in the Commission deliberations; this proved to be a most useful innovation.

Expanded Technical Assistance Program

The Commission was pleased to note from the statements of representatives of various countries that technical assistance programs were developing in a satisfactory and promising manner, not only because of the professional competence of the technicians sent by FAO but also because of their devotion to the work and their spirit of ready comprehension.

A paper tabled by the Argentine delegation on "Technical Assistance in American forestry and forest products planning" and included in the Commission's report, stated that Latin American countries on the whole have forests of immense value which when their tremendous potentialities have been surveyed, can contribute very substantially to the solution of the wood supply problem. For the most part, these forests are markedly heterogeneous, with a wealth of tree species, a factor which presents the main problem in their systematic utilization.

Latin American countries have been very slow to appreciate the potential role of their immense forest resources in the economy of the American Continent and of the world as a whole, and only the critical situation following Wolrd War II made it clear that present indifference to, or neglect of, this important heritage was prejudicing alike agricultural, industrial and forestry economics. There has now developed a healthy trend towards forest protection, improvement and expansion, with the establishment of the first technical services, completely independent of other public bodies, within the respective ministries of each country. There is still evidence, however, of the great need for accelerating forest rehabilitation which will ultimately benefit the whole of Latin America, and in which all countries without exception are anxious to collaborate.

Latin America is very different from Europe and the rest of the American Continent from the economic, social, political and linguistic standpoint. The psychology of its peoples differs even more widely with regard to silviculture and forest policies. All planning and preliminary surveys envisaged must therefore be conceived, organized and implemented with particular regard to the very special local conditions, and with an adequate representation of Latin American technicians. Such participation would also serve as a stimulus and a recognition for local technicians, enabling them to take part in highly important work relating to their own countries and to others with which they are historically and culturally associated. It is within the framework of the FAO Forestry Division and its technical commissions and committees that this cooperation can be made effective, and adequate Latin American representation both in numbers and in technical skill on such bodies should be brought about as soon as possible.

At this time of real testing for FAO, such a guarantee of collaboration is of the highest importance for combating propaganda aimed at weakening the faith of the American peoples in the constructive possibilities of the Organization. These reasons, the report concluded, also amply justify a similar need with regard to the composition of technical study missions in the various Latin American countries in which the participation of Latin American technicians is indispensable.

As a result of its discussions, the Commission recommended that governments of countries with FAO missions should always assign the necessary national technicians in order to obtain the best results from such missions.

It also recommended that young technicians be assigned to such missions to obtain training in the methods and procedures used.

The Commission also examined other forms of technical assistance which can be rendered by FAO: fellowships, national and regional education and training centers, study tours and general studies of an international character. It considered that these should be continued and intensified alongside the normal form of technical assistance.

The Commission considered that a periodic review of programs was desirable in order to bring them up to date as and when local conditions and/or the wishes of governments rendered this necessary. Emphasis was placed on the advisability of keeping the local action of the missions within the scope of the general or local policy laid down by the FAO Conference, and on the advantage of periodic visits to government officials and missions by FAO Headquarters and Regional Office staff.

Latin American Forest Research and Training Institute

The Commission was of the opinion that the establishment of the Latin American Forest Research and Training Institute was a matter of vital importance and emphasized the importance of research in the field and on experimental sites.

The Commission considered that the proposal of the Government of Venezuela offering as the Institute's headquarters the National University of the Andes (Universidad Nacional de los Andes) in the city of Merida, should be welcomed and approved. Following suggestions made at previous sessions for the establishment of regional forest research centers, the Commission considered that, at first, six such centers should be opened and strategically located in forest zones having their own individual characteristics, namely:

1. Mexico and Central America.
2. The Caribbean.
3. Tropical Andes.
4. Suthern Andes.
5. Parana - Plata - Paraguay.
6. Amazonia.

The following offers of sites had been made:

1. The Inter-American Institute of Agricultural Sciences at Turrialba.
2. The Tropical Forest Experimental Station, Puerto Rico.
3. The Tingo Maria Station, Peru.
4. Concepcion University, Chile.

The Commission authorized its Secretary to undertake the necessary negotiations for the formal establishment of the Latin American Forest Research and Training Institute, and appointed a sub-committee consisting of representatives of Argentina, Brazil, Chile, Mexico, Peru, United States and Venezuela and the Inter-American Institute of Agricultural Sciences to co-ordinate the work of setting up the Institute.

Forest policy

The Commission had before it the forest policy reports of Argentina, Brazil, Chile, Dominican Republic, Ecuador, Haiti, Honduras, Paraguay and Venezuela which were discussed by the delegates. In the absence of the delegates of Ecuador, Haiti and Honduras, note was taken of those countries' reports.

The Commission considered that, in view of the importance of the reports submitted, it should accept the Secretariat's proposal that a summary be made and distributed to Member Countries.

Amongst its policy recommendations, the Commission requested FAO to foster the federation or union of Latin American forestry associations with a view to co-ordinating their activities; that Latin American governments should take appropriate steps to enable insurance companies, provident funds and other organizations, custodians of public funds, to invest their reserves in afforestation and reforestation projects; and that governments should promote forest credit by granting long-term and cheap loans for such projects.

The Commission took note of the proposal of the Venezuelan delegate to submit the text of a bill on the conservation of renewable natural resources to a committee for examination. A committee consisting of the representatives of Argentina, Brazil, Chile and Mexico, was accordingly set up, which would communicate the results of its study through the FAO Regional Office in Rio de Janeiro.

Survey pulp and paper

The Commission took note of FAO's program for the development of world production of pulp and paper in compliance with the request addressed by the Economic and Social Council to FAO in its resolution No. 374 (XIII). It also took note of the surveys and work carried out jointly by FAO and ECLA following the latter's 4th session in Mexico in 1951, and welcomed this co-operation between international agencies on this important world problem.

The Commission recommended that FAO approach the countries producing and consuming seeds, requesting them to expedite interchange and trade in seeds of quick-growing forest species intended for the establishment of forest stands for the manufacture of pulp. The Commission believed that the various countries should take urgent steps to promote the import and export of seeds by working out commercial and financial agreements and by adopting appropriate customs measures.

Fourth World Forestry Congress

Taking advantage of the presence of Professor Eino Saari, organizer and chairman of the Third World Forestry Congress, the Commission heard his interesting statement on the various problems inherent in the organization of this type of international meeting.

Subsequently the Commission requested that, when it had been decided where the congress would be held, FAO approach the governments of Member Nations for their suggestions for the agenda and that it should request governments, in submitting their suggestions, to indicate an order of priority to facilitate the final selection of items for the agenda.

World Festival of the Trees

At the Sixth Session of the FAO Conference, held in Rome in November 1951, the delegates adopted an important resolution on the need for celebrating annually in each Member Country a World Festival of the Trees on a date suited to local conditions.

The Commission recommended that FAO provide countries with all possible information to enable them hold this Festival in the most effective manner. It drew particular attention to the value which countries attach to publications and films and requested FAO to supply all possible details on the manner in which Tree Festivals are celebrated in other parts of the world.

Protection of nature

Since in many ways the problems of the protection of nature and forest problems are closely related, the Commission considered that they too should receive attention. As the International Union for the Protection of Nature was to meet in Caracas, Venezuela, in September 1952, the Commission requested governments to arrange representation there by foresters and thus give them the opportunity of making useful contacts with specialists from other parts of the world. Finally, the Commission recommended that OAS should prepare a revised draft of the Washington Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere, and requested it to submit a draft, as soon as possible, to an *ad hoc* Panamerican meeting of qualified representatives.

Standardization

The Commission considered that the Anglo-Spanish forestry glossary now being compiled at the Tropical Forest Experimental Station at Rio Piedras (Puerto Rico), might serve as the ground work for standardizing forestry terminology in Latin America. The Commission requested the U. S. Government to place at the disposal of FAO the terminology and definitions available or in the course of preparation. FAO in turn would submit such terminology and definitions to the various countries for consideration, and then send the assembled data to the Rio Piedras Station to assist in the preparation of the final edition of the glossary.

New Chairman of the Commission

The final action of the Commission was to elect its new chairman for the period until the end of the next session.

Mr. Lucas A. Toriorelli, General Administrator of Forests of the Argentine Republic, was unanimously elected.

International Poplar Commission

The Sixth Session of the International Poplar Commission was held at Rome from 26-28 May under its chairman Prof. Ph. Guinier (France) with Prof. G. Houtzagers (Netherlands) as vice-chairman. Marcel Leloup, Director, Forestry Division, represented the Director-General of FAO.

Delegates attended from the following 13 countries, which included members and non-members of the Commission: Austria, Belgium, Finland, France, Germany, Greece, Italy, Netherlands, Sweden, Switzerland and the United Kingdom. The International Union of Forest Research Organizations (IUFRO) was also represented.

The chairman in his opening address gave an account of the work carried out by members since the creation of the Commission and welcomed delegates from countries who were participating for the first time, namely, Finland, Greece, Spain and the United States. Mr. Leloup, welcoming the delegates to FAO's Headquarters, commented on the rapid development of the Commission since its creation in 1947 and emphasized the results achieved. He also drew attention to the importance of the

Commission's future activities, which would be discussed in the course of the session, and the recommendations which might result from it leading to a world-wide extension of its activities.

Reports on the Work of National Commissions

Reports were submitted by National Commissions and similar organizations on their work, as well as by certain non-members represented at the session, in particular Greece and Spain. The Commission recommended that studies not yet complete on diseases such as "black heart" and "splitting of poplar" as well as the cultivation of poplar other than in forest stands (that is, in agricultural and particularly pastoral areas) should be continued and reports presented at the next session. Much information had been received from National Commissions on research on poplar diseases, and the Commission recommended that work should continue along the lines already indicated. Stress was laid on the dangers that could arise from the spreading of *Hyphantria cunea* which had recently been introduced in Europe (Hungary, Austria and Yugoslavia) from the United States, and it was suggested that National Commissions should watch carefully for centers of infection and take appropriate action to stamp it out.

Finally, the Commission considered it desirable for the purpose of comparison that the annual reports of National Commissions should be uniform in presentation and requested the Secretariat, in conjunction with the Permanent Committee to draw up a questionnaire to be sent to National Commissions prior to each session. It was decided that the questionnaire should be divided into two parts: the first comprising a general statement on activities on which an annual report had been requested at previous sessions, and the second special reports on the particular projects recommended for the year considered or undertaken by different countries in the course of the year.

Study of Poplar Cultivation on Selected Sites

In view of the preliminary results obtained in certain countries, in particular France and Belgium, the Commission recommended that surveying continue in order to get precise information on the increment on selected sites, with special reference to ecological and cultivation factors. National Commissions would later work in conjunction with forest research stations if it seemed likely that such co-operation would be advantageous.

Economic Aspects of Poplar Cultivation

The Commission recommended that National Commissions continue their research on the economics of poplar cultivation, particularly as regards cultivation on land other than forest land.

On the question of spacing, the necessity for adapting techniques to actual economic conditions was emphasized and, since no new information had been received which necessitated reconsidering the conclusions arrived at during earlier sessions, the spacing recommended previously was still considered to be the best. However, since such conclusions were based on economic conditions, National Commissions were advised to continue their studies on the subject in order to be able to bring technique into line with changing conditions and to benefit from the introduction of new types of clones.

Utilization of Poplar Wood

Following a recommendation made at the last session, an *ad hoc* working group to study the utilization of poplar wood was convened by the Chairman prior to the present session. The report of this working group was presented by the rapporteur, Mr. A. Janis (France), who referred to the Second Conference on Mechanical Wood Technology which was held at Igls, Austria, in August 1951. At this meeting it was agreed that the work of the International Poplar Commission conformed to its own objectives, and recommended that these should be followed up and developed. Mr. Janis also drew attention to the difficulties which resulted from lack of co-ordination between producers and consumers. The exchange of samples between countries was recommended and the attention of National Commissions was drawn to the possibilities of using poplar wood in the construction of wagons.

In view of the importance of this subject, the Commission decided that the working group on utilization, which up to the present had been established on an *ad hoc* basis for the different meetings, should become a permanent working group under the chairmanship of Prof. G. Giordano (Italy), with Mr. Janis as rapporteur.

Aspens

The Commission thanked Dr. Heimburger (Canada) for his report prepared at the request of the Secretariat. Reports were also presented to the Commission by some of the delegates on the situation and studies undertaken in their respective countries, in particular Finland and Sweden. National Commissions were advised to study the different types of aspen and their methods of reproduction, with particular reference to hybrids of American and European aspens.

Poplars in the U.S.A.

Prof. Houtzagers (Netherlands) commented on the conclusions reached by the mission of experts sent by the O.E.E.C. to the United States in 1950 to study American poplars and on the collaboration with American poplar experts, in particular Dr. Schreiner, the United States delegate to the present session. Dr. Schreiner gave an account of the work at present under way in the United States, illustrating his paper with a film. This was followed by a further discussion on plant spacing, and the Chairman emphasized that the objective of poplar cultivation was to increase production to meet the needs of industry, and said that the Commission had received valuable help in this field from American experts.

Future Activities of the Commission

After approving the general conclusions of the Secretariat with regard to future activities, the Commission approved in particular the extension of research to aspens and white poplars and the intensification of research on utilization by creating a permanent working group to study the subject. It was also agreed that regional meetings should be attended by poplar experts, if need be at the time of other forestry meetings. The Commission emphasized the danger presented by wood-destroying insects, a danger which would increase with the extension of poplar cultivation. and hoped that entomologists would always take part in the work of National Commissions.

It recommended that the most recent statistical methods should be applied to current research and requested that the methods actually used be presented at the next session for examination by a working group.

The Commission decided to meet only every two years starting with 1953, while the Permanent Committee would continue to meet every year, and would increase its members to nine, a third being renewable at each meeting. It was also agreed to request the Secretary to propose that the statutes be amended according to the decisions taken by the Commission, in order to permit the development of the Commission's activities.

The invitation of the government of the Federal Republic of Germany to hold the next meeting at Baden-Baden in the spring of 1953 was accepted, and it was confirmed that the fifth session of the International Poplar Congress would take place at the same time.

In Brazil, water-transport is all that can normally be used for timber, this logging pond at Manaus being one of many in the Amazon basin.

Technical Assistance Notes

Brazil

At the fourth session of the Latin American Forestry Commission held at Buenos Aires in June 1952, a report was presented on the work carried out so far on the development of the resources of the Amazon forests. This report covered the work done by a mission of three FAO specialists — K. McGrath (logging), R. Gachot (sawmilling), and N. M. Gallant (marketing and distribution) — as well as on the immediate and long-term programs proposed by the mission.

An initial acquaintance with the forests and forest industries of the Amazon brought out the two main problems to be tackled: (1) that the forests cover an area of some 3 million sq. km. with a widely dispersed population of 2.5 million, therefore necessitating development by successive stages of the areas most accessible to the inhabited regions; and (2) that numerous improvements are needed at once to maintain the woodworking industries even at their present level of efficiency. On the basis of these conclusions, and with the approval of the Brazilian Government, the members of the mission worked simultaneously on two programs — a short-term program for improving existing installations and a long-term one for development of forest industries as a whole.

Short-term Program. Logging is at present carried on virtually without mechanical means and hence is possible only near rivers. Neither the hand tools in present use nor the methods employed are suitable, and it has therefore been proposed to employ a trained lumberman to give demonstrations in the use of new equipment and the means of improving yield. Since logging is often carried out in areas subject to periodic flooding, a study of the equipment required for these conditions has also been undertaken.

There are three sawmilling problems of immediate concern: (1) the training of forest workers (a proposal to set up an Amazon training center with the help of FAO has been provisionally approved by the Brazilian Government); (2) the utilization of sawmill waste; and (3) the possibility of using light transportable mechanical saws in regions far from an industrial center.

Long-term Program. The overall aim is the intensive development of selected zones suited to the building up of a modern industry.

Although numerous botanical studies of forest species exist, very little is known of their distribution. Map data, too, is particularly scanty. Aerial surveying could, however, be profitably used over a large area of the Amazon basin (1) to determine the boundary between regions subject to periodic flooding and those free from flooding, and (2) to make a rough assessment of the different types of forest stands.

Since kiln drying has never been practised, it is proposed to establish a center for the study of methods of sawing and drying the chief Amazon species.

The mission is still investigating the possibility of reducing production costs and marketing questions, and proposes to study the possibility of extending trade both on the home and foreign market, and of increasing exports of species already on the market as well as of lesser known species. Investigations will also cover market conditions for products of the wood-using industries, veneers and wood pulp for example.

Honduras

In the course of one of his field trips, the FAO adviser on forestry, E. J. Schreuder, visited an experimental farm of the Banco Nacional de Fomento near Jalteva which included about 1,000 acres of agricultural land and a vast area of pine forests. He reports that, although the valley suffers from lack of water, there is no reason why irrigation should prove difficult. Most of the pine forests between Tegucigalpa and Jalteva gave evidence of serious fire damage, but, as many plots along the way and on the slopes showed, regeneration was mainly a matter of fire protection.

On another trip he saw a similar experimental farm at Comayagua, where abundant irrigation and better soil in the valley made a marked difference, and where it is planned to set up an irrigable forest tree

Chile

L. Hartman, a member of the FAO forestry mission to Chile, has recently prepared a report dealing with estimates of waste from logging operations and the present yield of sawmills. The two photographs reproduced above are taken from his report. Fig. 1 shows a sample log of Nothofagus procera *(average diameter, 50.5 cm.; length, 400 cm.) selected for experimental sawings at a sawmill using circular and band saws, and Fig. 2 shows the two boards and two cants cut by circular saw from this log.*

nursery. However, the road between Comayagua and Siguatepeque, reports Schreuder, winds along steep mountain slopes and offers an excellent show of the already denuded or partly devastated pine forests as well as those which are still almost untouched. Thousands of hectares of pine forest could be saved here without artificial planting if a vigorous fire protection organization could be set up. At different places between 3,000 ft. and 5,000 ft. above sea level we perceived thousands of very small pine seedlings, probably only waiting for their fate at one time or another. In the long ago denuded area, mostly at lower altitudes, erosion appears everywhere and xerophytic vegetation creeps in.

Haiti

L. Vinton Burns, FAO forestry officer in Haiti, writes that the Government has commissioned him to work out a plan for forest development in the Artibonite valley. Preliminary work has already been started there for the construction, at a cost of $20 million, of a dam and reservoir for hydro-electric power and irrigation purposes.

The plan provides for afforestation of 25,000 acres of Government land over a 10-year period: first year, 500; second, 1,500; with a maximum of 3,000 in 5 years and with a total expenditure of $780,000. In 15 months 23 nurseries have been established and 400 acres planted, and in order to carry out further plantation schemes the assistance of landowners, peasants, school teachers and even priests has been enlisted.

The "Service des Eaux et Forêts," which forms part of the Department of Agriculture and which was formerly responsible for the country's forestry and irrigation activities, has been split, irrigation being transferred to the Public Works Department. Since March 1951 an Afforestation and Soil Conservation Section has been created within the Forest Service and has done good work.

With the friendly co-operation of the Forest Service, plans have been established for forest development in the Artibonite, Grise, Blanche and Matheu-Delices valleys, and on and around the Morne de l'Hôpital hill that overlooks Port-au-Prince, whence the town draws its water supply.

A plan, part of a larger program, has recently been drawn up for commercial utilization of the country's forest resources, at the request of the Minister of Finance, and covers such questions as short-term investment such as plantations of species for production of fuel, tanbark, and rubber.

On the training side, in order to fulfill the need for trained foresters, lectures on afforestation and field demonstrations are being given to third-year students of the National School of Agriculture by the head of the Afforestation Section as well as by the FAO officer.

David Lubin Memorial Library

The David Lubin Memorial Library, which was formally inaugurated in June at the Headquarters of the Food and Agriculture Organization, is the largest agricultural library in Europe. It is not surprising that it should be, for it is a combination of three libraries, the Library of the International Institute of Agriculture, the International Silvicultural Centre and the small FAO Library of 30,000 volumes collected in Washington. The new installation at FAO Headquarters is impressive. Housed on the ground floor of a light, modern building, it contains 18 kilometers of shelves, 350,000 volumes, reading rooms, reference, photostat and microfilm services.

The major part of the collection dates back to 1909 the early days of the International Institute of Agriculture, and it is especially rich in its collection of agricultural statistics, which was a primary aim of the Institute's founder, David Lubin. The Library, however, also has a comprehensive collection on such subjects as agricultural economics, rural sociology, agricultural legislation, and sciences related to agriculture, such as botany, zoology and chemistry.

Marquis Cappelli, one of the first presidents of the Institute and a great book-lover, collected 1,000 volumes in his period of office, and bought, among other books, some of the Institute's thirty-two incunabula. These fifteenth century books are mentioned in such catalogues as those of Hain, Copinger and Reichling. Five are treatises on agriculture; Crescentius, *Libro dell'agricoltura* (1480), *Scriptores rei rusticae* (1494), a collection of writings on agriculture by Columella, Varro, Cato and Palladius (1496) and (1499), and the *Bucolica et georgica* of Vergil (1490).

Works of literature and philosophy owned by the Institute in their early Italian or German editions are: the *De deorum* of Boccaccio, *De rerum natura* by Lucretius and *Historia naturalis* and *Storia naturale* of Plinius.

Thanks to the $32,000 granted by the 1951 FAO Conference from residual Institute funds, the Library will be expanded and some of its gaps filled.

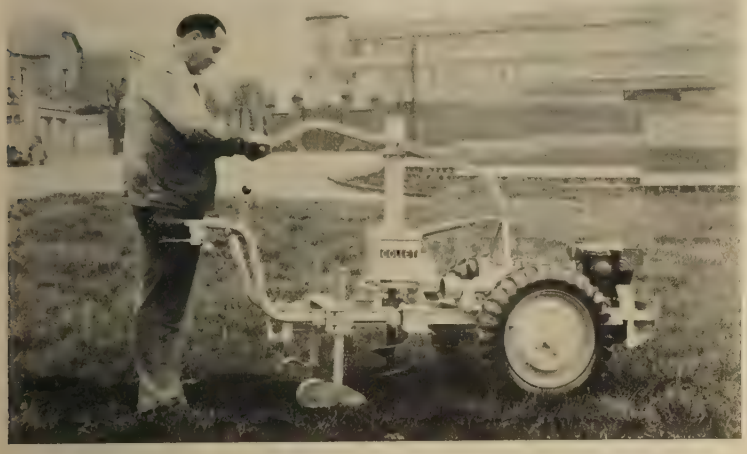
FAO owes its existence, in part, to the persistence of this American of Polish origin who fought for, and established, the first international organization for the improvement of agriculture, the forerunner of FAO.

Equipment News

Interest in the development of forest utilization and woodworking industries is reflected in the continual [illegible] for information on new equipment. FAO's Forestry Division collects such information and passes it, on [illegible] to Member Governments. Some of the information collected is published here. FAO accepts no responsibil[illegible] the claims put forward by manufacturers.

POWER SAW FIRE PUMP COMBINATION. — By means of a new mounting and coupling device a standard low-speed, high-pressure gear pump may be attached to an ordinary power saw. The photo shows the pump in action with a normal power saw motor. The pump is easily portable, being mounted on a packboard. *Specifications*: Pump together with accompanying equipment weighs 57 lb. May be attached to 5 or 7 h.p. motors; with 5 h.p. motor pump pressure through 2 hoses is under 75 lb. and with 7 h.p. motor is under 100 lb.

Weherhauser Timber Co., 1106 U.S. National Bank Building, Portland 4, Oregon, U.S.A.



Les Fils d'Albert Collet, 41 rue Cardinet, Paris 17e, France.

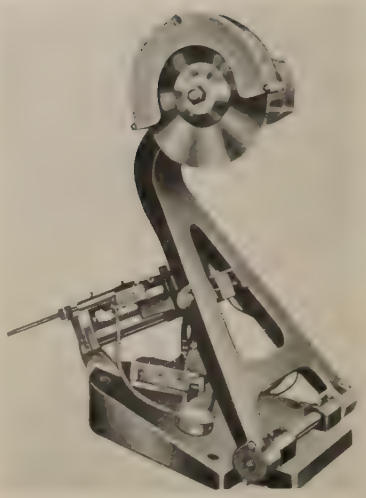
COLLET MOTOPLANTER. — A mechanized hole borer for afforestation work. Accessory equipment is available for clearing the surrounding ground, and the machine is designed for easy movement from one boring operation to the next. It can also be used as "motocultivator" by attaching various accessories, and it is hoped eventually to equip it with a pulley so as to utilize the motive power for working a pump, which would be useful in nursery work. *Specifications*: Motor: Bernard W110; wheels have tractor-type, heavy tread tires, and individual brakes. Depth of bore - 30 cm., diameter of hole - 10-30 cm.

LAND-CLEARING MOTORMULE. — A track-laying, load-carrying, logging tractor fitted with land-clearing equipment. This new Motormule has a slightly longer chassis than former models, standard logging winch as well as special heavy winch with haul of up to 45,000 lb. and cable capacity of 3/4 inch to 100 yd. Driving sprockets and both winches driven by same Diesel engine: 5 speeds. Tractor has six independently moveable bogey wheels on each side, and can be fitted with steel tracks or rubber-linked, rubber-padded tracks manufactured by *Atkinson's Agricultural Appliances Ltd. (Clitheroe, Lancs, England).*

Motormuli, Hacker u. Co. Komm. Ges., Molln, Austria.

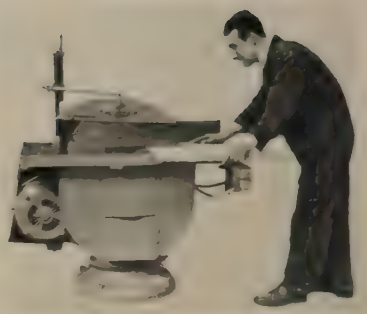
TIMBERHOG BANTAM CHAIN SAW. — A modern lightweight chain saw with the following special features: automatic chain oiler maintains flow of oil to chain during cuts. Narrow guide bar is particularly suited to pulpwood cutting, while planer-type chain enables fast cutting of all timber. Aluminum and magnesium parts ensure light weight. *Specifications*: full 360° swivel. Weight of unit including 18 inch guide bar and chain: 27 1/4 lb.

Reed-Prentice Corporation, Worcester 4, Mass., U.S.A.



IRVINGTON 26-A CUT-OFF SAW. — For defect and all-purpose trimming in sawmills, planing mills, remanufacturing plants. Available in right or left hand models. *Specifications*: Motor: 3 h.p. for 16 inch saw, or 5 h.p. for 18 inch saw, 3,600 r.p.m.; 220 or 440 volts, 60 cycle, 3 phase, ball bearings. Overall height of machine, 4 feet 3 inch. Operating table height, 33 1/2 inch with 18 inch saw and 34 1/2 with 16 inch saw.

Irvington Machine Works, 1808 N. E. 7th Avenue, Portland 12, Oregon, U.S.A.

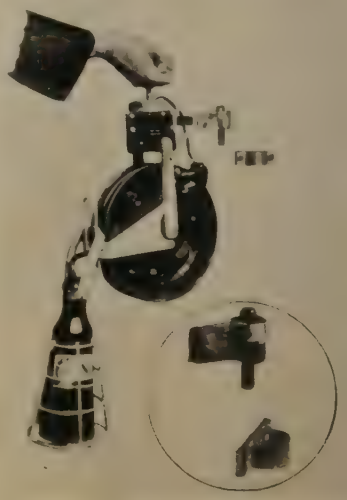


"BESCO" TURRET SAW BENCH. — Saw bench equipped with rise and fall spindle. *Specifications*: saw has two speeds, 3,000 r.p.m. and 1,700 r.p.m., and self-contained, built-in motor, which drives saw spindle through V-ropes and is complete with starter, isolator and 24 inch saw blade. Table moves either right or left to 360° on main base.

F. J. Edwards, Ltd., 359-361 Euston Road, London, N.W.1, England.

CHEMICAL SPRAYER. — Petrol-driven sprayer which can be used for killing insects and for spraying plants as a protection against frost. *Specifications*: weight of sprayer unloaded, 11 kg.; dimensions - length, 165 cm., height, 35 cm., breadth, 28 cm.; petrol content, 1.3 liters; chemical spray content, 4.5 liters.

Schwingfeuer, Vertriebs - Gesellschaft M.B.H., Überlingen/Bodensee, Germany.



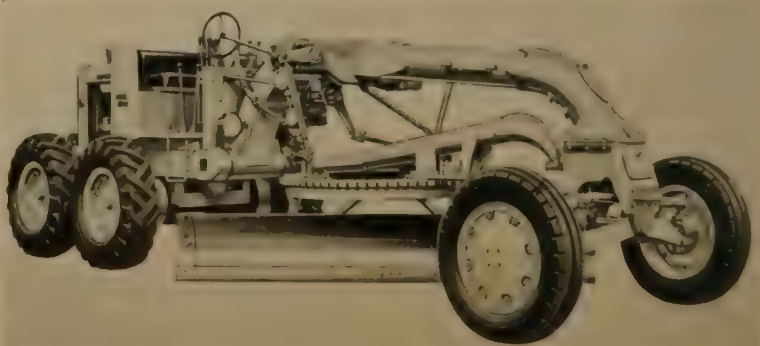
SELF-WINDING ELECTRIC CABLE REEL. — The reel, attached to ceiling or wall bracket, keeps the cable clear of the floor and of possible damage. Standard length of cable will serve an area 50 feet in diameter, but only sufficient cable need be paid out to reach the desired point. Cable rewinds automatically onto drum when not required. Special connections permit rotating and swivelling. Metal parts and inspection lamp cage are earthed. Enamel finish protects the device from acid fumes and damp atmosphere.

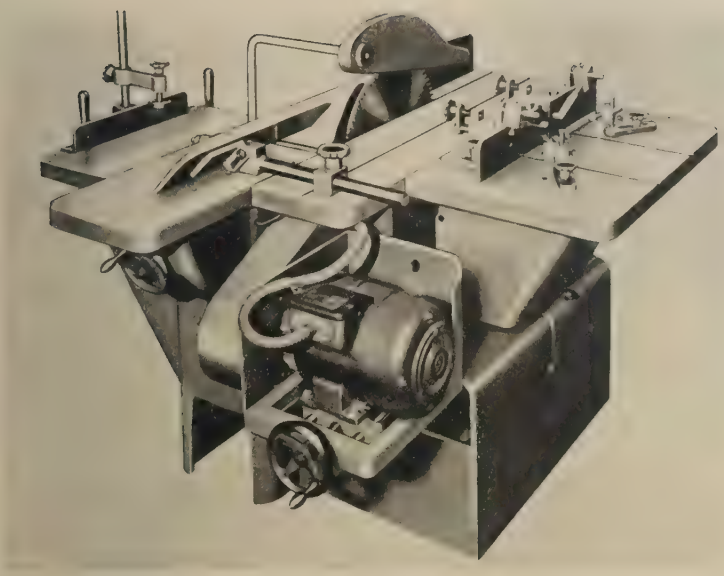
Power House Components Ltd., Albion Chambers, King Street, Nottingham, England.

AD-40 AND AD-30 MOTOR GRADERS. — Tandem drive gives full traction on these graders. Accessories and special equipment are available to increase adaptability and to meet a wide variety of conditions.

Specifications: *AD-40*: 4 cylinder, 2-cycle diesel engine; weight, 23,000 lb., 104 brake h.p. *AD-30*: 3 cylinder, 2-cycle diesel engine; weight, 22,700 lb., 78 brake h.p.

Allis-Chalmers Manufacturing Co., Milwaukee, Wisconsin, U.S.A.

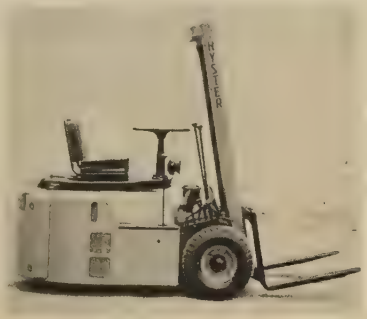




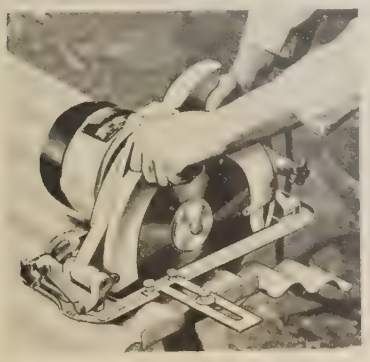
Interwood Ltd., 326 Old Street, London, E.C.1, England.

HYSTER LIFT TRUCK (MODEL 20). — Variations from the standard Hyster lift truck are: optional 3-piece additional counterweight to bring truck up to 2,000 lb. capacity at 24 inch load centers; optional counterweights bolt to rear of machine with 8 capscrews, adding 2 1/4 inches to overall length. With new " skeleton " counterweight, capacity is 1,300 lb. at 15 inch load centers and 1,000 lb. at 24 inch load centers, with no change in overall length.

Hyster Company, 2902 N.E. Clackamas Street, Portland 8, Oregon, U.S.A.



AUTOMATIC SAW SHARPENER. — In this machine, a new [illegible] grinding wheel head [illegible] wheel by means of sh[illegible] a flange motor at rea[illegible] built-in dust extractio[illegible] mechanism. *Specification*: [illegible] grinding wheel, 1/4 h.p.; fla[illegible] 1 h.p. Weight approx. [illegible] capacity: sharpens circula[illegible] from approx. 4 3/4 inch to [illegible] diameter, and of 1 inch to 2 [illegible] bore. Latest type is fitted [illegible] speeds, 32 and 65 teeth per minute, and with adjustment by lever [illegible] three different profiles of teeth.



" WOLF " ELECTRIC SAW (TYPE R.S.10). — Depth of cut determined by hand wheel adjustment on a vertical quadrant; riving knife of tempered spring steel relieves back pressure of saw blade. Cut indicator fitted to sole plate ensures accurate positioning for straight and bevel cuts up to 45°. For ripping and cross-cut work a " combination " blade is supplied, and for plywood a " planer " blade. A ripping guide is also provided which can be adjusted for ripping or cross-cut work up to 5 1/2 inches in width. The use of magnesium alloy in frame construction ensures lightness.

Wolf Electric Tools Ltd., Pioneer Works, Hanger Lane, London, W.5.

OVERHEAD LATHE CHARGER. — The feature of this equipment is the hydraulic operation from single set of controls. All shafts are mounted on ball bearings, wheels on roller bearings. To ensure alignment, carriage drive is through a pinion at each end of the drive shaft and gear racks on the runway beams. Lift cylinders are hung in a saddle and are protected from shock loads by rubber-backed clamps. All cylinders have automotive type piston rings, large diameter polished piston rods and honed cylinders of heavy wall seamless steel tubing. Clamping arms have bronze sliding shoes which are adjustable according to wear. Lathe specifications are according to plant requirements.

Ederer Engineering Co., 2931 First Avenue South, Seattle 4, Washington, U.S.A.

News of the World

The items appearing here are condensed selections of news thought to be of interest to readers of UNASYLVA. *They are grouped alphabetically by countries under headings currently used by the Forestry Division for reference purposes. The Editor will be glad to receive direct from readers authenticated items of interest and of news value for this part of the review.*

General

BRAZIL

• Special courses in forestry have been organized at several of the Agricultural Colleges (São Paulo and Minas Gerais). The Federal Rural University, situated about 50 km. from Rio, some years ago began an 18-month course for agricultural engineers covering the following subjects: forest botany, silviculture, forest technology and applied industrial technology. Recently plans have been drawn up for a special Forestry College, a project which is still to be approved. Several special courses for workers in forest industries are being conducted jointly by the Instituto Nacional do Pinho and the Serviço Nacional de Aprendizagem (government school for apprentices).

ITALY

• The serious threat to many of Europe's national parks from hydro-electric schemes has affected also the Parco Nazionale del Gran Paradiso, the home of almost the last truly indigenous herd of Alpine ibex, lying in the magnificent mountain group between Aosta and Turin to the extreme north-west of Italy.

It was started in 1836 as a royal hunting preserve for the protection of the ibex, then almost extinct, and 150,000 acres were set aside for a national park in 1920. The ibex are now flourishing, but their existence is menaced once again by a scheme to build a line of pylons through the Park from Aosta to Turin. The Park authorities are resisting the scheme, more because it would disturb the ibex and make it harder to prevent poaching, than for aesthetic reasons since in that region of vast mountains the pylons would not be noticeable. They fear, moreover, that this concession, once granted, would lead to other large-scale hydro-electric schemes.

Work on the scheme has been temporarily suspended, but permanent suspension is desirable, for the preservation of the Alpine ibex in particular, but also of all the other wild life found there. Excellent use is made of the Gran Paradiso for scientific research. The Center of Alpine Biology at Turin is making a systematic survey of all flora and fauna, including a search for natural anti-biotics, as wounded chamois have been observed to cure themselves by eating an as yet unidentified plant.

Italy has three other national parks: the Stelvio, in the North-eastern Alps; the Abruzzo, in the Central Apennines; and lastly the Circeo, to the south of Rome, which is of interest for its typical Mediterranean forest land.

UNITED STATES OF AMERICA

• The program of the privately financed Conservation Foundation of New York City, is continuing to extend its scope to cover all the various aspects of natural resources. The work is divided into four broad fields: (1) research; (2) consultant service to government agencies; (3) study of industrial problems; (4) furthering educational work in conservation. A number of current research problems deal with various aspects of forestry, including a study of a selected watershed as a community; a complete survey of groundwater resources; a comprehensive analysis of vegetation in relation to water yields; the joint study with FAO of soil erosion areas in the Western Hemisphere; an independent review of U. S. forest resources; an ecological study of the Alaskan wilderness, and in particular the relations of animals, forage and human beings; and an analysis of statutory and legislative barriers to conservation practice.

Each project is planned and organized under the leadership of a competent specialist and a report is prepared on each project completed.

• The U. S. Department of Agriculture has issued Bibliographical Bulletin No. 18, entitled "The Forests of Continental Latin America". This bibliography is the result of a selected examination of books and periodical literature published between 1920 and 1950 on the forests of Mexico, Central and South America. It is a guide to background information for anyone interested in the forest resources of Latin America and their utilization. The listing of references is sub-divided by countries.

• For 55 years the New York State College of Agriculture at Cornell University, has published an annual rural school leaflet designed to help rural teachers instruct students in a better understanding of their environment. The current Leaflet or handbook gives a concise background on soil and water conservation, forest conservation, and wildlife conservation, emphasizing the inter-relations, for example, of good farming and forestry practices on soils and waters. Under each of the major headings, sample demonstrations are described, whereby teachers may demonstrate the processes which lead either to land and resource deterioration or to improvements.

• *Ecology of American Forest Species - Erosion and Reafforestation* is a report on the first three subjects assigned to Technical Assistance Mission No. 18, composed of experts from OEEC countries to the United States, and is concerned with growing conditions of American species, reforestation of semi-desert and waste land, and soil erosion in forest areas.

The first part of the report deals with forest geography, forest types, climate and soils, choice of provenance, forest trees and their utilization, growth, yield and thinnings, and cutting methods and regeneration. The eight European experts on this part of the mission were guided by American technicians in their tour of eastern forests, prairie belt, the rocky mountain and the Pacific regions. From their observations they were able to draw conclusions useful in their own countries on a number of American species already known in Europe, and on methods of thinning and regeneration. It is evident from the report that there was a real exchange of ideas, so that the visitors contributed as much as they received during the tour.

Part 2 of the report, dealing with reforestation of semi-desert and waste lands under difficult climatic conditions, was of particular interest to three of the experts who visited plantations, shelter belts and nurseries in Nebraska, Colorado, Utah and South California. As a result they obtained very useful information on nursery and planting practices adaptable to similar problems in their own countries.

The third part of the report deals with laboratory investigations on soil erosion in forest areas, and the preventive measures to be employed. The five members of the team visited the south-eastern and southern United States, Arizona, California and Utah under the guidance of technicians from the U. S. Forest Service. Their observations are presented under the headings of problems encountered in the south-eastern and south-western parts of the United States, with particular emphasis on water supplies, forest policy and the relationship between forest fires, over-grazing and erosion. They commented on methods for the prevention and control of erosion, and were particularly interested in the research activities,

installations and investigation programs. The report summarizes American methods and draws interesting conclusions on the possible adaptation of American methods to European conditions, particularly with regard to research, the use of natural species and methods of controlling erosion.

● *Timber - American Forest Operations and Increase of European Productivity* is another report dealing with the results of a mission of experts on forestry and forest products from OEEC member countries to the United States.

The group visited logging and milling operations in the southern and north-western parts of the United States under the guidance of Government and private foresters and engineers. The report consists of general observations on raw material supply, labor and social welfare, safety precautions and accident prevention, cost of operations, trade associations and research work. These observations are followed by descriptions of problems and methods encountered in logging or milling, plywood and veneer, utilization of waste wood, and conditioning and marketing of wood products. Under each of these headings the experts considered what they had seen in terms of what might be applicable to conditions in their own countries. In addition, the report contains quite a comprehensive bibliography of publications arranged according to such headings as U. S. trade associations, board, pulp and paper, glues, grading and standardization, kiln drying, logging, marketing, plywood, research, sawmilling, statistics, trade journals, trees and their timber, veneer, utilization of wood and wood waste, wood working and wood products and work simplification.

The publication aims at providing a record for the participants of the mission, but in addition will prove extremely helpful to other technicians in OEEC countries who were not fortunate enough to be included in the tour.

Venezuela

● A survey was carried out from April to June, 1951, by scientists of the University of the Andes, Merida, to investigate the possibility of creating a National Park in the Sierra Nevada region of the Andes. The park, which will cover approximately 1,200 sq. km., is intended primarily for the study of questions related to the conservation of flora, fauna and soil. The study group investigating the question has prepared a booklet, just published by the University, giving the preliminary findings of the survey and reporting on the geography, geology, climate, flora, and fauna of the area, as well as on the potential touristic, educational and scientific value of such a park. There is already relatively easy access to some parts of the area, as several roads lead up to, or run along, the borders of the proposed park.

● Rapid progress has been made in the last few years in the teaching of forestry in Venezuela. The Faculty of Physics and Mathematics of the University of the Andes, Merida, in 1948 established a school for forest engineers, which aroused considerable interest. The choice of the University for a forestry school was an excellent one both from the point of view of the facilities at its disposal as well as its locality. As of July, 1952 it was decided that the forestry school should be raised to the status of a faculty. Simultaneously, discussions have been under way as to the possibility of making Merida the center of the Latin American Forest Research and Training Institute.

A recommendation for setting up this Institute was first put forward at the Forestry Conference at Teresopolis, Brazil, in 1947, and plans for the Institute were later drawn up by FAO's Latin American Forestry Office and discussed at various meetings of the Latin American Forestry Commission. At the latter's last session in Buenos Aires in June 1952, the University of the Andes made a formal offer of accommodation for the Research Institute, which was unanimously accepted.

Fundamental Science

Ceylon

● In Ceylon there are large and widely distributed areas of grass, fern and savannah which have the superficial aspect of being permanent types and which are believed by some to be, in fact, permanent types. Detailed analysis of this situation involved climatological analysis, for which the systems of Swain and Thornthwaite were found most useful. This analysis indicates that nowhere in Ceylon does the climatic complex preclude the ultimate development of closed forest, and this conclusion applies to the seven major classes of grass, fern and savannah vegetation found. Climate and soil conditions are insufficient to account for differences between these vegetation classes and forest, but historical and other evidence shows that the grass, fern and savannah vegetation was caused by man's activities in clearing, burning and cultivation, and by periodic reburning after abandonment. Thus the major ecological conclusion is that all these are subclimax types and replacement of them by forest is feasible in ecological terms.

Indonesia

● An ecological analysis has recently been made in Sumbawa and Timor, the primary purpose being to determine the indigenous tree and shrub species adapted for use in reforestation in the many situations where planting is to be considered. This involves, first of all, a detailed determination of the situations in which each species now occurs or has occurred in the past; second, the [illegible] of species in terms of the [illegible] for which reforestation is to be d[illegible] — that is, timber production, water shed protection, shelterbelts or similar purposes.

The published results show [illegible] general, though with some excep[illegible] the distribution of species is controlled by climate, soils playing a subordinate role. Thus the main sites on an ecological basis are:

(i) lowland soils without high ground water in the monsoon region, sub-divided into six classes based on degree of dryness;
(ii) lowland soils with periodically high ground water;
(iii) the moist region in the lower hills;
(iv) the rather dry hill region from 400 to 1,000 meters in elevation;
(v) the moist lower mountain region from 1,000 meters;
(vi) the moist mountain region above 1,500 meters.

For each site or sub-site the species ecologically suitable for use are listed separately for timber production, soil protection, protective strip and artificial shelter planting objectives. The basis of the study is the belief that long-term success in planting must be confined to species ecologically suited to that site, and that, conversely, long-term difficulties will follow attempts to violate this primary rule.

United States of America

● Sawdust and wood chips can be used for a wide variety of agricultural mulches and for soil improvement, provided the limitations are understood. Such materials contain only small quantities of the usual nutrients required in fertilizers and they should therefore be supplemented by nitrogen fertilizer at the rate of 24 pounds (11 kg.) per ton of fresh sawdust; the nitrogen may be in whichever form is most economical and should be added in at least two applications during the growing season. Sawdust has little effect on soil acidity, but it is desirable to supplement it with 100 lbs. or more of finely ground limestone per ton of dry material unless acid soils are desired. Weathered wood material is preferable, since fresh material may contain substances inhibiting plant growth.

Silviculture

Canada

● A study has recently been made in Ontario of the effects of different forest litters on height growth of hybrid aspen in pot cultures. Nine types of litter, representing both overstorey and understorey vegetation, were used, applied at the rates

of 1,000 and 3,000 pounds per acre (1,120 and 3,360 kg. per ha.) The litters were finely ground and mixed with silica sand. The higher rate of application of plant material produced significantly greater new shoot length than the lower rate, and the litter of subordinate forest vegetation was superior to that of tree species in producing growth.

Japan

• Reforestation in Japan began many centuries ago and is a major activity today, but because of extensive overcutting during war years there is a back-log of about 7 ½ million acres to be reforested which, in view of the present forestry situation, constitutes an excessive waste of the limited land resources.

The main conclusions of a recent study of forest planting and nursery practices are:

(i) seed source zones for all species should be established and followed, and additional data should be obtained and thereafter applied;
(ii) seed collection according to tree size and age should be liberalized, but tightened as to origin of seed trees;
(iii) seed cleaning and storage facilities should be made adequate to handle the maximum amount of seed needed, and these facilities should be made available to all who require them;
(iv) irrigation systems should be installed at larger nurseries to increase the output of stock per unit of area;
(v) seedling stock rather than transplants should be used more widely and nursery techniques developed to make 2 and 3-year old seedlings the equivalent of transplants;
(vi) chemicals for control of insects, diseases and weeds should be used more cautiously and knowledgeably;
(vii) suitable equipment should be provided for field planting crews;
(viii) except on rocky ground, the one-man grub hoe planting method should be used instead of the center hale method;
(ix) more care should be given to the position of the roots in planting, both in nurseries and in the forest;
(x) on unstabilized soils, plantations should be protected against removal of duff and leaf litter;
(xi) better correlation of research in nursery and field planting with immediate problems is needed;
(xii) more intensive training is needed of those concerned at all levels in the mechanics and techniques of the work.

There are already about 29,000 nurseries, and nursery expansion has about reached its practical limit. The problem of standardizing practice thus involves the retraining of large numbers of technicians and workers.

Malaya

• According to *The Malayan Forester*, the mangrove forests of Malaya have a productive area of 78,000 acres. They are managed on a rotation of 30 years, two-thirds for the production of charcoal, one-third for firewood, with an annual yield of 120,000 tons of firewood, 36,000 tons of charcoal, and 12,000 tons of poles. There is an annual net revenue to the government of about $2.50 (Malayan) per acre. So far there has been no really comprehensive study of mangrove silviculture. Natural regeneration has been successful on over two-thirds of the annual cutover area, and until recently, planting of unregenerated areas was relatively inexpensive. Today, planting costs are very high and it is very difficult to obtain the necessary labor. Moreover, shorter rotations are now regarded as desirable, and delays in securing regeneration are thus more significant than formerly. Shorter rotations tend to favor the establishment of inferior species. Although the desirable species begins to produce abundant crops of seed at about 4 years of age, dependence on natural regeneration results in many small blanks which, in the aggregate, have a substantial effect on yield. If the small patches are planted artificially, the plants often suffer severely from attacks by crabs.

There are various factors inimical to natural regeneration including deep flooding on lower lands, invasion of cutover land by aggressive ferns, heavy accumulation of slash due to poor utilization, crabs, the capture of land by inferior species, digging of canals, and several lesser factors. Although it is desirable to have natural regeneration on the ground before clear felling starts, this is not always possible. Retention of selected seed bearing trees, either permanently or temporarily, has been tried as a means of ensuring regeneration but the expense and effectiveness vary widely, and no really complete study of possibilities has been made. It is considered, however, that only on the basis of retention of seed bearers can the basic problem of regeneration be solved and experiments along these lines are now proposed.

United Kingdom

• Recent studies in various methods of girdling 20-year old Corsican pine (*P. laricio*) as a means of stimulating seed production show that:

(i) girdling the stem increased cone production in the second season after treatment;
(ii) trees with large girths and crowns produced more cones per tree than trees with small girths and crowns, both treated and untreated;
(iii) effects of treatment were greater when applied to trees with large girths and large crowns;
(iv) there was no significant difference between the different methods of girdling and banding;
(v) girdling was most effective when applied in May, and least effective in January;
(vi) health and vigor of treated trees remained unaffected two years after treatment.

United States of America

• Development of tree-planting machines in the U.S.A. began in the late 1930's and has speeded up greatly since 1944. There are at least 16 principal manufacturers, several of whom have different models, and several thousand machines are in use. Experience shows that if a machine can be used at all, survival rate of the trees is equal or superior to that of hand planted trees, and planting cost is lower if the purchase price of the machinery is amortized over the period of serviceability.

A summary of the principal machines has been made by the U. S. Forest Service covering types, method of operation, personnel required, weight and costs. All machines can handle plants other than trees, including various farm crops. Some machines have a single operator, others, two, so that two rows can be planted simultaneously. Most of the machines have replaceable parts.

• In the Lake States, ground preparation as a means of stimulating regeneration in understocked aspen (*Populus tremuloides*) stands has been tested through disking strips, using a 6-foot wide heavy disk drawn by a tractor at a cost of $4.00 to $7.00 per acre.

In one test, when the disking was done just before a heavy seedfall, the number of seedlings per acre one year afterwards was 185,000 compared with a negligible number on undisked strips. About 173,000 of the seedlings were paper birch (*Betula papyrifera*), and it is anticipated that deer browsing will greatly reduce this number, favoring the desired balsam fir (*Abies balsamea*), red maple (*Acer rubrum*), aspen and spruce (*Picea*) which are the desired components. Disking can best be conducted with a heavy seed crop and sufficient seed trees.

Experimental thinnings on 11-year-old overdense aspen stands show that the man-hour costs per acre are respectively 11.2 and 16.8, indicating the economy of thinning at the lower age despite the greater number of stems then removed.

• Studies in the vegetative propagation of Canadian hemlock (*Tsuga canadensis*) in the U.S.A. shows that:

(i) higher precentage of rooting is obtained from cuttings made from first-year wood than from second- or third-year wood;

(ii) a low percentage of untreated cuttings took root, whereas a higher percentage of cuttings treated with indolebutyric acid and a-naphtaleneacetic acid rooted;

(iii) in general, treated cuttings taken from the middle of August to late January were most successful;

(iv) percentage of cuttings which rooted was increased by powder-dip treatments with a fungicide.

Logging and Engineering

BRAZIL

• K. McGrath, FAO logging expert, reporting on the problem of mahogany extraction in the Amazon forests, says that "the mahogany belt extends in what appears to be a substantially unbroken belt from the Tocantins to the Solimoes into Peru. However, it occurs only round the top of the basin in the upper reaches of these rivers. Apart from small and recent exploitation in the Tocantins, mahogany has been extracted almost solely for supply to Manaus, where it has been milled since the early 1930's. The Purus, Jurua and Solimoes have been the sources of this supply."

Unfortunately the mahogany belt is no closer than 2,000 miles (3,200 km.), by water, to Manaus and occurs mainly above the cachoeiras (waterfalls) which are numerous in the upper reaches of all these rivers. Practically all the timber which could be at all effectively extracted by the antiquated hand rolling methods which alone have been practised to date, is now exhausted. At present only a third to two-thirds of the logs felled get to the mill, and then only with the greatest of difficulty and at very high cost.

By modern methods, however, there is no technical problem of any magnitude in delivering this timber in big quantities, and in all probability at only a fraction of the present cost. The basic problem appears to be not so much the lack of modern logging methods and efficient extraction, but rather the total absence of any real idea of the volume of timber standing in the catchment of any given waterway; data of this kind, which is fundamental to an estimate of the economy of carrying out engineering works to permit the ready exit of timber over or round the cachoeiras, could be obtained by aerial survey.

UNITED STATES OF AMERICA

• Regeneration has always constituted a major problem in mixed stands in the California pine region. It is desirable to save such established advance reproduction, as has not been destroyed during the extraction of timber. Experience has shown also that new reproduction of the valuable sugar pine (*Pinus lambertiana*) is not generally obtained when the method of silviculture is on the commonly used tree selection basis. Problems therefore are to save desirable advance growth and to obtain sugar pine reproduction on cleared regeneration areas.

Causes of excessive damage to young growth include: (i) unnecessary and improperly located roads, landings and yarding trails; (ii) improper felling; (iii) use of certain types of heavy machinery in young stands; (iv) insufficient supervision of logging crews.

The California Forest and Range Experiment Station has recently studied on one of its experimental forests the following steps which may be taken to minimize damage:

(i) careful advance planning in the location of roads, etc.;

(ii) marking in reference to the ways in which logs will be taken out;

(iii) conducting cutting in two stages, together with intensive training and supervision of loggers.

There remains, however, the necessity of developing new types of logging equipment capable of handling the heavy logs and which is at the same time less destructive to the young growth.

To obtain reproduction of sugar pine or to prepare the ground for seeding and planting, it is necessary to choose and clear regeneration areas. This involves clear-cutting, bunching of slash and debris with powerful machinery and stirring up and preparing the ground. Further work is needed to devise the best type of blade for use on the tractors so that bunching of debris and proper soil preparation can be accomplished in a single operation.

• In the southern Appalachian Mountains, the high-lead system of logging is reappearing and, due to the high risk of damage inherent in the system, is opening up questions as to where it may be used in logging. On some areas which are highly unstable and erosive, it seems evident that no logging at all should be permitted. On other areas, only extreme caution and additional costs for handling the sale of timber will make it possible to permit logging; and on other areas, ordinary practices will be adequate to minimize damage to soils and water values. The recrudescence of high-lead logging makes a new appraisal of different types of areas necessary.

Forest Injuries and Protection

UNITED STATES OF AMERICA

• A new Federal law, signed by the President on 13 May, clears the way for the northeastern states and the contiguous Canadian provinces to combine in fighting forest fires on either side of the international border. Regional planning, involving both countries, has been developed so that maximum use of available equipment and personnel can be applied in emergencies as required.

• Current advances in methods of fire control reported in *Fire Control Notes* are of various sorts, origins and significance. In mechanization, refinements and improvements of older basic devices are the general but not exclusive rule. Radio mounting in pickups and jeeps, a long rope parachute, application of hydraulic controls to a sulky plough, a new type of hand compass for smoke chasers, an improved smoke candle for testing lookout visibility, a combined pressure relief and check valve for hose lines from tankers, a tree pusher, three improved hand tools, plastic impregnation for maps, a canteen carrier for trucks, and a hose vulcanizer are reported.

One new device for fire line construction is a heavy duty miniature hay rake, devised and now being tested by the Missouri Conservation Commission for use in broadleaf litter. The Lake States burning meter index, originated in 1936, has been revised on the basis of additional data and their analysis. It has a very good record, but cannot cover all the minor variations that occur in nature from area to area.

One persistent problem in controlling big fires has always been that of timing the various key steps, in each of which several officers are involved. For example, it requires some hours after the line boss calculates control forces needed for the next shift, before service chief, plans chief, fire boss and dispatcher can each perform his function, the forces can be assembled and transported and the line boss receives them ready for work. So postponement of decision anywhere means less than calculated effectiveness in suppression. The problem of regular if limited rest for key officers is often unsolved and costly mistakes due to fatigue result. The answer is a timetable, now worked out from the abundant experience of the California National Forest Region, which integrates key decisions and the key officers concerned.

The ancient and hardy perennial problem of fire prevention where active belief in burning, apathy, carelessness and heavy industrial use are prevalent, as in the National Forests of Oklahoma, is carefully analyzed. Identifying area where fires from specific causes and motives occur, spotting — at least by suspicion — the individuals and groups responsible, a planned campaign of instructing them in the real discordance of fire and their belief in fire, working out substitutes for burning as a land clearing tool or source of employment — these are main steps in the new line of attack.

• Since 1941, stations have been maintained in the National Forests of Oregon and Washington, at which

records are obtained of fuel moisture conditions as a measurement of the fire hazard. Standard fuel moisture sticks are used to obtain measurements.

In 1951, the average of the 25 days with the lowest fuel moisture was lower than for any other year of the record, indicating the observed fact that the fire season was more difficult than preceding ones. In each of the last four seasons, appraised on the same basis, the trend in fuel moisture has been steadily downward, indicating the persistence of a period of desiccation.

Forest Management

Finland

• Comprehensive time studies on the more important types of logging in Finland have been conducted by the Central Association of Finnish Woodworking Industries with the object of determining the time spent on conversion of stems of different sizes into various kinds of timber.

The elements of working time are divided into: (1) those recurring with every stem and dependent on the size of the stem; (2) those recurring with every stem but independent of the size of the stem; (3) those not recurring with every stem and independent of the size of stem.

Correct piece work schedules for wages have been developed as a result of the studies. Another factor effecting determination of wages is the relative difficulty of the work, which is dependent on such elements as the number of branches, thickness of bark, density of the strip marked for cutting, defectiveness of the trees, depth of snow and air temperature. The effects of these on output and wages have been determined and new schedules prepared, taking account of difficulty factors as well as size of the tree.

United States of America

• Results of a 9-year study on the effect of farm woodland grazing on watershed values in the southern Appalachian Mountains have recently been reported in the *Journal of Forestry*. The area chosen for study had not been burned for 40 years nor grazed for many years. It had been logged in 1914 and the hardwood forest had grown back, and before the study began, a 7-year period had elapsed.

The major results shown by the study were that trampling had substantially reduced soil porosity and infiltration capacity through compacting the top 4-inch (10 cm.) layer of soil; accumulative effects of browsing and trampling were adversely affecting the quantity, timing and quality of runoff in storm periods because the stream showed sharper breaks, rises, peaks and recessions than before grazing began; sheet erosion now occurred from a progressively larger area each year; the water now required treatment for municipal use whereas it did not before grazing began; and the aspect of the forest had changed markedly. Moreover, the annual growth per acre of superior hardwoods was being reduced by at least 30 percent a year, and this loss far more than offset in dollar value the value of the grazing. The cattle in fact did not thrive on the woodland grazing, and there was thus no benefit to offset the demonstrated land and timber losses.

Industry and Trade

Brazil

• Germany and Portugal are reported to be the chief European markets for the comparatively heavy export of logs from the Amazon Islands, Germany being interested mainly in peeling logs such as *Quaruba*.

Trade with the United Kingdom is preferred to trade with the United States which calls for thicknesses to the quarter inch, a degree of precision difficut to achieve with the machines available.

The Islands cut chiefly for export and enjoy the advantage of ready local offtake of the poorer qualities produced. The bulk of the latter production is consigned to Brazilian ports, where demand is less exacting than on the European market.

The sawmills in the Amazon Islands are superior to those on the mainland and the quality of the sawn output correspondingly higher. However, logs, whether sawn or exported as such, are comparatively small in girth, and it seems likely that forests accessible to manual extraction will soon be depleted and that the time is approaching when mechanical means of extraction will have to be resorted to if supplies to the sawmills are to be assured.

Canada

• For the purpose of publicizing Canadian industries and products the Government of Canada is issuing a series of stamps. The series includes the 20 cent stamp illustrated below which represents papermaking, one of the most important industries dependent on the Dominion's great timber resources. This is symbolized by a simple coniferous tree from which curls a broad strip of wood changing gradually to paper.

• The technical Section of the Canadian Pulp and Paper Association had at the time of its 37th annual meeting in 1951, a total membership of 1,246, together with 79 sustaining members, mostly companies. A small paid staff handles the section's affairs. There are 8 branches and 14 technical committees, the latter dealing with alkaline pulping, boards, engineering, engineering data sheets, fine papers, fundamental research, heat and power, mechanical pulping, newsprint, physical and chemical standards, process instrumentation, sulphite, waste, and the joint textbook. Several annual awards are made, two to junior and student members for original papers.

At annual meetings a number of sessions are organized, each including several technical papers dealing with some aspect of the field covered by the Association. The first regular summer conference on basic research was held in 1950, and a regular summer meeting is held as well. Great effort is made by officers to form sound relations with the newly organized Pulp and Paper Research Institute of Canada and a textbook on pulp and paper manufacture in two volumes has recently been published.[1]

New Zealand

• The housing project of New Zealand Forest Products, Ltd., at Tokoroa, the largest private housing scheme in the country, involves almost total use of *P. radiata* in construction, while interiors of the 800 houses to be provided will be lined with wallboard manufactured from the same timber. *P. radiata* is available throughout New Zealand in grades conforming to the specifications of the New Zealand Standards Institute. Rough sawn timber is supplied in dressing, framing and boxing grades.

Pakistan

• A high-grade paper mill and board manufacturing mill, employing some 700 people, is expected to go into production in the Northwest Frontier Province at Nowshera by the middle of 1954. The mill, which is being set up by the Pakistan Industrial Development Corporation, will produce 7,500 tons of high-grade paper and board per annum from indigenous raw material. Construction of the building for the mill is at present under way.

Forest Products and their Utilization

China

• It has been announced recently that the Kiangnan paper mill in Shanghai has begun to make paper

[1] Vol. I: Pulping and Papermaking.
Vol. II: Properties of Paper and Converting.

pulp from bamboo following a Soviet pulp soaking method which, it is claimed, not only halves the time for producing, but also results in a 12 percent increase in the amount that can be obtained from raw material.

Extensive use of bamboo could have a considerable effect on China's paper output, which is not keeping pace with constantly rising demands. Bamboo, an important product in China for centuries, is widely cultivated and is a conspicuous feature of the landscape in the south-east. Although it has for centuries been an indispensable article of construction throughout south China, its use for housing and scaffolding is declining with the adoption of more advanced building methods and greater quantities will be available for the numerous paper mills in Kwangtung Province.

Following experiments with a variety of materials during the past two years, the Chinese are now manufacturing pulp from straw — again using a Soviet technique — as well as from rice stalks and the stems of cotton plants, in an effort to expand the country's paper industry. The most important success so far, however, has been with *chih chi tsao*, a kind of grass that grows along the Yellow River. Previously it was used only to make brooms, but it has now been found highly suitable for the making of certain kinds of paper.

In spite of the most intensive efforts, however, China's paper industry is not yet able to supply more than a portion of the country's requirements, which have risen enormously in recent years mainly owing to the nationwide campaign to abolish illiteracy.

Indonesia

• The Forest Research Institute of Indonesia has recently revised and brought up to date a volume of the names for 400 of its principal tree species. The species are first arranged alphabetically according to scientific names of families, genus and species, for each of which is given the preferred Indonesian name; distribution, specific gravity of the wood, and the wood class, are then given, the last in five groups ranging from those suitable for heavy construction in contact with moist soil to those suitable for temporary construction only. In a second grouping the Indonesian names are arranged alphabetically, followed by the scientific name of the family and species, and finally by cross-reference to the first major listing.

United States of America

• In the state of Washington, many logs unsuited for sawn lumber were formerly left in the woods. Recently, methods have been developed by which sound material in such logs can be economically utilized by pulp mills. This involves breakdown of the logs to eliminate unsound material, and scaling practices under which the volume of sound material can be determined to the joint satisfaction of buyer and seller. Various practices are in use, including measurement by the cord, cubic volume and weight.

• Recent tests have been made of sulfate pulping of thinnings from ponderosa pine stands 20 to 40 years old, 4 to 10 inches d.b.h., and 15 to 30 feet in height in the state of Idaho. Various rates of pulping chemical to wood were used to produce sulfate semi-chemical, kraft, and bleaching sulfate pulps. The ponderosa pine material was generally very similar in pulping characteristics and in strength of pulp produced to jack pine (*P. banksiana*), a pulpwood of accepted satisfactory quality, except for lower chemical requirements and lower yields of screening rejects.

• In recent years, much research has been conducted on lightweight composite or sandwich construction. This is based on the concept of employing all available materials rather than a single material, and in setting up for specific uses the desired requirements in mechanical and physical properties not yet available in any material. Sandwich construction through efficient structural design makes it possible to stress each material to its practical limits. Research is under way in England and Holland as well as in the U.S.A. In the latter country, much of the work is done by or for the Air Forces and Navy in development of aircraft.

Sandwich construction consists of two facings of a strong material separated by a core of lightweight and weak material, and thus the sandwich is a structure and not a material. Both empirical and theoretical approaches are being made to the work.

Research is done on materials, both for surface and core, on the development of design criteria, on adhesives and fabricating techniques, on inspection methods, on exposure and serviceability tests, and on uses and types. A recent development is that of a paper honeycomb as a core in sandwich structures for use in aircraft.

Already many uses of sandwich structures have been developed, including radar antenna housings, propeller blades, fuselages, wings, doors, flooring, bulkheads, stabilizers, ailerons, flaps and various interior parts, as well as for missile wings. For housing and general building construction, research is already well ahead of application, but there is need for mechanical equipment to fabricate honeycomb cores and prefabricated panels.

It is expected that sandwich construction will find new uses as the work continues.

• From 1926 onwards, a unit of the Forest Products Laboratory, Madison, Wisconsin, has been conducting continuous investigations on means to improve efficiency of small [illegible] defined as those produc[illegible] than 20,000 board feet (47.2 m.³) p[illegible] 8-hour shift. There are 51,000 s[illegible] mills in the U.S.A. and the numb[illegible] is increasing rapidly. Thus more and more attention needs to be given to the development of efficient small mills, including equipment, installation and operation.

A very large and comprehensive number of machines and devices are manufactured, and ready means for evaluating these are not always available to the small mill operator. The problem includes not only the relative costs, output, quality of product, degree of waste, etc., of the machinery, but involves also layout of small mills, operational problems, mill management policy in buying and selling, inventories, sales outlays, and business management.

The first comprehensive and up-to-date handbook resulting from the laboratory's work and covering the aspects of interest to operators has recently been published. One of its more valuable features is the information, for example, on the uniformity of production when different types of head saw rigs are used, and there are many other data which may help the operator to decide between the conflicting claims of manufacturers. A glossary of special terms enables the non-technical reader to understand fully the compact and well illustrated text.

• The U.S. Department of Commerce has recently compiled a select bibliography of 2,737 titles dealing with wood conservation and the production and utilization of lumber and other wood products. The subject is divided under the following ten headings: (1) Production and production equipment; (2) Construction and products; (3) Wood needs and market outlets; (4) Physical properties and uses of native woods; (5) Foreign woods; (6) Value of research programs; (7) Veneer, plywood and laminates; (8) Moisture relations and seasoning; (9) Durability and preservative treatment; (10) Utilization of wood waste.

The selection includes mainly articles, bulletins and other references with the principal objective of better wood use in a time of national emergency.

Forest Policy

Australia

• In the surge of clearing natural vegetation for farms in the wheat belt of Western Australia during the past half century, the process has been carried too far. Insufficient shade trees, wind-breaks and shelter belts, inadequate fire wood and timber supplies, areas of incipient wind erosion, all indicate that a well thought out program of tree planting is now required.

Many species of trees have been tested under varying conditions for

varying purposes, and the methods of selecting species, planting and tending are relatively well worked out. Such information has recently been prepared by the Forestry Department for use by the land owners of the area.

• Timber ranks after coal and steel among raw materials required for the expansion of Australian industry, public development schemes and defence programs, and for the fulfillment of housing requirements. Yet preoccupation with coal and steel shortages has distracted attention from the serious inadequacy of available timber supplies.

Sawmill output of indigenous timber rose from 701 million super feet (1.7 million m³) in 1939 to 1,133 million super feet (2.7 million m³) in 1950, but the increase involved deterioration in quality of timber cut and depreciation of forests. Since exploitable forests make up only 4 percent of the total land area, the maximum production which can be sustained from indigenous forests is probably no more than 1200 million super feet (2.8 million m³). Deficiencies in indigenous softwood supplies have always been met by imports which amounted to 323 million super feet (800,000 m³) in 1939, 32 million (75,500 m³) in 1943 and 248 million (585,000 m³) in 1950, the net decline being due to dollar restrictions since alternative suppliers in the Baltic, Pacific islands, Borneo, New Zealand and Brazil have not offset the declines from North America. Although indigenous timber supplies about 82 per cent of normal consumption requirements, its proportion will decrease due to increasing population through immigration and normal growth, and to increasing per capita consumption which has already risen from 161 to 168 super feet (0.380 to 0.396 m³) since 1938 and which, to catch up with war shortages, must rise to 189 super feet (0.446 m³).

The shortage of timber in 1951 was about 212 million super feet (500,000 m³) and by 1955 is expected to be 327 million (772,000 m³). To balance supply and demand, an increase of 93 million super feet (219,000 m³) above current imports of 260 million super feet (614,000 m³) will need to be attained and continued for the next five years.

During the war, 59 percent of total supplies were devoted to direct war purposes, and the advent of a national emergency could greatly slow down or halt normal civilian building programs. Moreover, emergency demands might again result in damaging the sustained yield capacity of indigenous forests. Thus it is urgent that a vigorous policy of obtaining imports be followed, even to the point of building up reserve stocks against a possible future national emergency.

The outlook for increased imports from North America is not regarded as bright, since the U.S.A. is a net importer, and the bulk of Canadian softwood exports go to the United Kingdom and other countries.

Within Australia there is discordance of timber area and population in the different states, since, for example, New South Wales and Australian Capital Territory have 16.2 percent of the total forest area and 39.7 percent of population, whereas West Australia and Northern Territory have respectively 22.7 and 6.9 percent. Opportunities for additional planting of softwoods above the present area of 297,000 acres may amount to about 600,000 acres but there is no assurance that a program of planting of the necessary magnitude will be carried out and, even if it is, the country will still require a large and continuing program of imports.

Brazil

• The greater part of forest land in Brazil is privately owned, except in the states of Para and Amazonas where a considerable proportion is still state-owned. The federal Brazilian forest code dates from 23 January 1934, but some of the states have, in addition, established their own laws. For centuries forest land has been badly exploited or turned to agricultural and pastoral use. However, as a result of the efforts of the semi-governmental Instituto Nacional do Pinho and the Federal Forest Service, in co-operation with State Forest Services and States Secretaries of Agriculture, a new interest in good forest practices and soil conservation has been aroused.

The Instituto Nacional do Pinho has established eight forest parks in the Paraná pine region (in the states of Rio Grande do Sul, Santa Catarina, Paraná and São Paulo) where extensive reforestation has been carried out, primarily with *Araucaria angustifolia*, and to a lesser degree with indigenous broadleaved species. In addition, the Federal Forest Service has created a number of national parks and forest nurseries which provide seeds and seedling for distribution.

Some forty years ago the Paulista Railroad Company started extensive experiments and plantations with *Eucalyptus* spp. Other large-scale reforestation work has been carried out since the war by several other private companies, notably the Klabin Paper Mill in Paraná and some of the big mining companies in Minas Gerais, for example the Belgo-Mineira Company.

Ecuador

• The Forest Department of Ecuador, a branch of the Ministry of Economy, was founded in mid-January 1949 by the present government, and since its inception has been doing intensive work for the welfare of the country through the activities of its various services. It is devoting considerable effort in ascertaining the nature and extent of the country's forest resources with a view to their future systematic development. The natural forests lie on the outer and interior foothills of the Andes, as well as in western and eastern Ecuador, but little or nothing is yet known of the species in many of these forests, their identification, classification, or economic and commercial value. As a beginning the Department has, so far as funds and staff permitted, been conducting scientific botanical surveys of the forest in various parts of the country. First priority has been given to such work, which must form the basis for future determination of economically valuable forest areas, and of stands containing commercially and, above all, industrially valuable species. A botanical and forest atlas is planned, as well as a systematic catalogue of species.

As a result of these surveys of forest resources, the Forest Department has been able to establish a Forest Botany Museum of considerable scientific and historical value. The museum, opened on 5 March 1951, is considered to be one of the finest in Latin America. It includes a herbarium containing 23,000 botanical specimens of Ecuadorian flora collected over the past 15 years from all parts of the country; a dendrology section with specimens, complete with bark, of over a thousand species of Ecuadorian woods from both the coastal area and the mountains (a list of the trees and woody plants of Ecuador already catalogued has been published in a book compiled by the Director of the Department); a lumber specimen collection, undoubtedly one of the most complete in South America, consisting of 1,600 standard-sized samples of Ecuadorian sawn woods of value in international trade, for domestic consumption or display purposes, and samples for studies of the physical and mechanical properties of the woods; a forest products section. Annexed to the lumber specimen section, there is an exhibit of 1,200 microslides of anatomical studies with cross, tangential and radial sections of the main Ecuadorian timbers, prepared by the University of Michigan, U.S.A.

A further branch of the Forest Department, the Forest Statistics Service, was established in order to survey the country's natural and artificial forest resources and to determine the extent of domestic wood consumption.

Afforestation and reforestation work has been, and will continue to be, a primary concern of the Forest Department, whose aim is to establish a network of tree nurseries for reforestation purposes throughout the country. The Department has four tree nurseries at Carchi, Imbabura, Pichincha and Bolivar, from which, as an important social service, it supplies, free of charge, plants suited to the particualr district, altitude and climate to persons carrying out reforestation work or individual tree planting. It has so far distributed over 2 million seedlings of various genera, mainly eucalyptus, cypress, walnut, cedar, pine, acacia and

willow. With the aid of a grant of $15,000 from the Rockefeller Foundation for the period 1952-1953, the Department will considerably expand its national afforestation and reforestation service; new tree nurseries will be established at Riobamba, Cuenca, Loja, Zaruma and Guayas, the number of plants in existing nurseries will be increased, mechanization will be introduced and more trees and plants will be distributed.

Educational work too has been expanding side by side with practical developments. Through lectures, the press and bulletins, pamphlets, circulars on afforestation and reforestation, control of cutting, etc., the Forest Department has succeeded in arousing "forest consciousness" in the country.

Japan

• A study of forest and forest products research in Japan recently made by a visiting expert contains the following main conclusions:

(1) To improve economy and increase effectiveness, all forest products research should be centralized in one laboratory, including transfer of wood utilization research from other ministries. Forest research regions should be reduced from 7 to 5, together with consolidation where dual branch facilities exist in the same locality.
(2) Operational work on experimental areas, together with the necessary funds, should be, transferred from the National Forest Section of the Forestry Agency to the Forest Experiment Station.
(3) Programs in both forestry and forest products research should be broadened to include practical applicability of results.
(4) Statistical methods should be applied to experimental design, analysis and interpretation wherever possible.
(5) Formal periodic inspection of branches and sub-branches should be made by the Forest Experiment Station.
(6) Provision should be made for the station to receive funds from industry and other agencies for co-operative research.
(7) The budget for research, which is now about 1.3 percent of the total forestry budget, compared with 8.5 percent in the U. S. A., should be approximately doubled during the next 5 years.
(8) The Director of the Station should be authorized to study research organization, program determination, analysis of problems, project evaluation, experimental design, performance control, research applicability and adoption of research results achieved in the U.S.A.
(9) Library facilities and channels for the flow of recent technical information should be improved.

The present forestry situation in Japan obviously demands intensive and comprehensive research to improve both production and utilization of forest products.

Malaya

• In the Federation of Malaya there is the usual problem of how much and what forest is to be firmly reserved and freed from the insistent demands for agricultural land inevitable with spreading populations. Despite progress, the reserved forest area dedicated to timber production is far less than, for example, in Germany. The responsibility for land use and land planning is divided between two sections of the government.

In Malaya, as elsewhere, land degradation results from improper use of lands naturally covered by forest. During the Japanese occupation, considerable areas of forest reserve were cleared for production of food, and on some of these agricultural use has continued. So far it is only possible to guess or estimate the area of land already degraded. Despite land planning by the Forest Department to maintain climatic and physical conditions of the country, safeguard water supplies and soil fertility, and prevent damage by erosion and floods, much further work and study is evidently needed.

As a whole, the Federation is in a relatively early stage of development, and eventually great additional areas of forest will be assigned to agricultural crops. Even so, the problem of determining what reserved area will be needed to supply timber should be faced now while there is still the opportunity to put a suitable plan into effect. Moreover, the yield of useful timber from the tropical forests of perhaps 500 cu. ft. per acre (35 m^3 per ha.) is no more than $^1/_{10}$ the yield of better coniferous forests in Europe, and $^1/_{30}$ that of the Northwest American forests. With proper management involving short rotations, the yield can probably be brought to the level of European coniferous forests. If the per caput consumption, now low, increases to the level prevailing in Europe, each 1,000 inhabitants will require 350 acres (142 ha.) of productive forest or 5 acres (2 ha.) cut annually on a 70-year rotation. If an ultimate population of 18 million is estimated, about 10,000 square miles (26,000 sq. km.) of productive forest will be needed for local consumption, compared with the present area of 8,500 square miles (22,000 sq. km.).

In some states, continuation of the present rate of exploitation will result in working of all productive forest within the next 30 years, and dependence on imports for requirements. The tolerance of waste when forests are abundant, as at present, is unsafe ground for planning future self-sufficiency.

Essentially the problem is one of balanced economy, rationally planned, rather than a haphazard scramble which has characterized the [illegible]. For one thing, on land [illegible] be assigned to agriculture, the timber can [illegible] utilized, provided roads are built [illegible] fore clearing and other appropriate steps are taken as well.

New Zealand

• Forestry legislation in New Zealand began with an ordinance in 1841 asserting Crown ownership of the kauri forests purchased from the Maoris, providing for their protection from the then current abuses. Other laws were subsequently enacted, but it was not until 1918 that the Ministerial Office of Commissioner of State Forests was separated from that of Minister of Lands. In 1920 a separate sub-department, now the New Zealand Forest Service, was organized, and the Forests Act of 1921-22 established the legal basis for operations. The key problems of earlier days were to reconcile forestry and settlement, and the frequency with which forests were destroyed by fire. Permanent State Forests increased from 800,000 acres in 1888 to 6,472,000 acres in 1950 or including Provisional State Forests, to 9,434,000 acres.

Notable recent legislation includes the Forest and Rural Fires Act of 1947 as later amended, and the amended Forests Act of 1949, revising and improving the Act of 1921-22.

Throughout the history of forest legislation there has been a tendency to establish the rights of public ownership and to bring all related matters under one authority. Earlier it was believed that the individual had personal rights in Crown lands, but this has now been abolished and it is fully established by law that State Forest lands are to be administered for the benefit of the nation as a whole, and any use or occupancy must be under lawful authority.

In general, a review of legislation shows that many of the earlier laws recognized correct principles, but both implementation of the laws and their enforcement were incomplete, and thus severe damage, in many cases, was uncontrolled. At present, the body of law provides all the powers likely to be required for a considerable period.

• Recently a member of the New Zealand Forest Service has analyzed the first 30 years of forest practice as a basis for appraising probable future trends.

The Service, when established in 1920, fell heir to a forest estate of about 6 $^1/_2$ million acres, most of it indigenous forest, together with about 37,000 acres of exotic plantations. Early efforts to manage the indigenous forests resulted in the conclusion that they were unmanageable and thus could not be perpetuated economically. This, coupled with forecasts of timber famine and rapid growth of exotic plantations, led to a great program for exotic plantations, both by the Forest Service and by many private companies. Thus, by

about 1930, the country was irrevocably committed to future dependence on an exotic timber economy.

The depression of the early 1930's made great changes, among them the speeding up of the plantation program due to the abundance of cheap labor. As the depression ended, so did cheap and abundant labor, and foresters began to appraise the great planting program which had reached a total area of about 800,000 acres. Most of this area was concentrated in one region and away from the main centers of timber consumption, and little attention had been paid to providing local timber supplies. Most of the forests were broadly of one age class, and two-thirds of them consisted of one species only, *Pinus radiata*. Moreover, spacing had been wide, and thinning, though obviously needed, had been little practised. By 1940 the early plantings were beginning to yield substantial quantities of timber which were absorbed by the New Zealand market.

During the war, the exotic forests were called on for production and met demands effectively. After the war, the vastly increased labor costs hamstrung forestry, although there has been a trend toward creation of small forests to meet local demands. But thinning is confined to stands which yield saleable products, and the area treated is limited by manpower and equipment shortages so that there are large arrears in thinning.

Efforts to work out effective silviculture and management for indigenous forests, particularly of kauri and beech, continue but the answer has not yet been found.

At present, one forest is yielding 28 million cubic feet of timber per annum under sustained yield, the bulk of which is over and above domestic needs. The expected timber famine has vanished, and instead there is an embarrassing surplus, effective capitalization on which is a challenge to foresters. A great omission of past practice was the failure to thin the young exotic plantations early and often enough, for which the reason given at the time was the lack of saleability of the thinnings. That this past reluctance, and the timidity in adopting a bold program of thinning based on the needs of the forests, has by no means vanished, is shown by the present limited programs. Meanwhile, shortages of cheap labor are a deterrent to a really adequate silvicultural program, despite the abundant evidence that failure to thin early results in stagnation of growth and great eventual losses of production.

Problems for the future are therefore how to care properly for the great estate of exotic forests, how to manage successfully indigenous forests, and how to capitalize on the large potential timber output now ready for the world market.

Samoa

• A recent study shows that typical problems of land use and forestry prevail on the 38,000 acres of American Samoa as much as in larger areas elsewhere. About 1,000 acres are suited to permanent agriculture and are already so used. A further 10,000 acres can be used for agriculture followed by forest fallow, provided proper soil conservation measures are used during the agricultural period. The remaining 18,000 acres are wholly unsuited for agriculture, are now mostly covered by forest and should be managed as forest.

The poulation, which has more than trebled during the past half century, must live primarily upon the vegetative products of the soil, since other industries are of minor importance. Provided proper land use for agriculture is introduced, a population of 25,000, estimated to be reached by 1958, can be supported. Administration of the area by the U. S. Navy has been directed towards justice, law and order, paid employment, medical services and education, but little attention has been given to the production of the essentials of life, only one percent of public expenditure being devoted to agriculture and almost nothing to forestry.

Many of the woods are not used and their qualities are unknown. A small sawmill could be started, using practices established in other tropical areas and employing local labor.

Establishment of control over land use by means of a Land Use Board is of major importance. To be most effective, such a board would need detailed maps and establishment of definite ownership to specific areas to replace the present "custom and usage" system; thus a Land Ownership and Demarcation Commission is needed. A Forest Dedication Scheme, similar to that successfully used in Fiji, appears adapted to American Samoa. Under this scheme, forest land remains in private ownership under control of government technicians, the owner receiving a fair rent with a fair tax paid from the earnings.

A demonstration area is required, and a parcel of land is available for this purpose. The demonstration should be controlled by the Forest Service, which it is proposed to add to the Department of Agriculture.

A most serious problem is loss of alluvial flat land at mouths of streams held in place by mangroves, but which erodes as the trees are cut. Prohibition of tree cutting on the immediate shore would prevent further erosion.

At present, American Samoa is prosperous. To establish it on a really self-supporting basis will take time and effort, but the possibility of doing so exists. To broaden the experience of local legislators and technicians, it is proposed that study in other countries be provided for selected individuals. A forest policy with control of all natural resources, and the commodity and non-commodity values of forests should be recognized.

United States of America

• Forestry problems in the urban state of Connecticut have recently been analyzed by the Federal Reserve Bank of Boston. Although about 78 percent of the population is urban, over 60 percent of the state's 3.1 million acres is forest of one kind or another. Most of the forest land is of low or medium quality, stands are ragged and irregular, slow growing hardwoods predominate, and thus the outlook for commercial private forestry is generally not good, particularly for hardwood forestry. In particular, the current system of taxing forest lands is regarded as a severe deterrent to private ownership, since tax rates in 95 percent of the townships are higher than forest properties can sustain. Since alternative uses of capital offer higher rates of return, it is evident that a major change in taxation is desirable if private ownership is to be important in future forestry.

• The International Woodworkers of America (Congress of Industrial Organizations) has recently adopted a forest management policy including:

(i) federal regulation for all cutting on private timber lands everywhere to include sustained yield, selective cutting, multiple use and intensive management;

(ii) provision of public technical and financial aid to small timberland owners on condition of proper management;

(iii) an end to the federal-private sustained yield units;

(iv) rapid expansion of timber access roads;

(v) management of the old-growth forests of the Pacific Northwest and Alaska to perpetuate the plywood and structural timber industries;

(vi) rapid expansion of the national forest system by purchases;

(vii) establishment of a national redwood forest;

(viii) experimentation in public purchase of managerial rights in private timber lands;

(ix) greatly increased public credit for forestry;

(x) use of agricultural aids for forestry;

(xi) greatly increased appropriations for forestry.

Reviews

It is the policy of FAO to review here only selected publications which appear to have a direct bearing on the current work of the Forestry Division.

PATHOLOGY IN FOREST PRACTICE. D.V. Baxter. 2nd Edition 1952. pp. 601. Illus. John Wiley & Sons, Inc., New York. Chapman & Hall, Ltd., London. U.S. $7.50.

The present edition of this very comprehensive book on forest pathology includes much material new since the 1943 edition.

The incidence of disease is presented in relation to site and practice in nurseries, plantations, and in natural mature forests. There is an interesting discussion on relationship between fungi and other plant pests, and many practical notes on the care of shade and park trees. An important chapter deals with the handling and treatment of forest products, with regard to decay, stains and moulds, and other defects.

The new material, which shows the progress achieved since the first edition, includes interesting information on pole blight in the Northern Rocky Mountains, dieback of birch in New England, littleleaf disease of pine in the Piedmont region of the southeastern part of the United States. There is also new material on the use of DDT and 2-4-D, on virus diseases, on the use of preservatives, and chemicals to control stain and mould. A number of the illustrations are also new, including many excellent photographs and diagrams.

PROPERTIES AND USES OF TROPICAL WOODS - III. F. F. Wangaard and A. F. Muschler (Tropical Woods 1 June 1952). pp. 189. Illus. Yale University. New Haven, Conn. U.S. $1.25.

This report is the third of a series prepared under a research program of the Yale School of Forestry in co-operation with the U. S. Navy Department, to determine the basic properties of selected American tropical species. Reports I and II appeared respectively in *Tropical Woods* 95: pp 1-145, 1949 and *Tropical Woods* 97: pp 1-132, 1950; they describe the test procedures being employed and give the results for some 50 species of tests of specific gravity, mechanical properties of unseasoned woods, shrinkage, decay resistance, and airseasoning characteristics. Information was also supplied as to the source of the timber, its availability, and an evaluation of the present and potential utilization of each species.

The present report presents the results of tests of the mechanical properties of the same species in air-dry conditions, and brings up to date additional information which was not available in the previous reports, particularly with regard to strength properties of green wood. It also includes reports on studies of glueing, moisture absorption, weathering and steam bending for most of these species.

These three reports provide a valuable reference for those interested in the status of knowledge of tropical wood species of the Western Hemisphere and of the possible uses to which these species can be put.

SUR L'UNIFORMISATION PAR LE HAUT (UNE MÉTHODE DE CONVERSION DES FORÊTS SAUVAGES). C. Donis and E. Mandoux. Institut National pour l'Etude Agronomique du Congo Belge (I.N.E.A.C.). Serie scientifique No. 51. pp 77. Brussels, 1951. 100 (Belgian) francs.

This report is an interesting presentation of studies in the Belgian Congo to improve the composition, growth rate and age-class distribution in hardwood forests of the tropics. There are detailed descriptions of the topographic elements, studies of the soil, associated vegetation and light intensity, and comparison of these factors in relation to species composition, character of the regeneration, and growth of lianes and vines. Especially interesting is a description and discussion of the silvicultural measures followed on large experimental plots and on the results obtained. There are also brief comments on the application of the methods studied to large-scale programs for the conversion of tropical forest stands to greater yields of species with higher commercial value than exist in the original forest.

PRACTICE OF WILDLIFE CONSERVATION. Leonard W. Wing. pp. 412. John Wiley and Sons, Inc. New York. 1951. U.S. $5.50.

As wildlife conservation in the U.S.A. moved from the realms of exploitation, politics, perpetuation of bad hunting and fishing practices, rigid legal controls and the other familiar early stages into a partly scientific program, the growing need for trained men led to the teaching of wildlife management in colleges. At the same time, the need arose for already established foresters, range and farm managers and others dealing with land and water to know something of the effects of their normal practices on wild species and populations. A massive and growing volume of technical literature of widely varying quality came into being — little of it available to the college student or the land manager.

In this book, the author emphasizes early and wisely the biological basis of management, a science in which many managers and students are not well versed, and hence the reason for many past blunders. The techniques of field investigation and practice are also well developed.

Each of the major groups of birds and mammals — those of farm, forest and open range — have special characteristics, as has each of the main species, in general and individual habitat requirements, vulnerability to hunting, predation, disease and the like, and so effective management practices must vary for each.

Forest species of birds and mammals are greatly affected by different silviculture practices, and the author proposes measures that are unlikely to be welcomed by foresters; allocation of all but "first class" timberlands to wildlife and recreation, elimination of domestic livestocks grazing on winter ranges, modification of silviculture, perpetuation of openings, avoidance of one species stands, light cutting in small dispersed units. Emphasis on the practices helpful to wildlife is clearly desirable to balance the common concentration of managers on a single value of the forest.

Geographic groups and those defined in other ways — fur bearers, water fowl, non-game species, the rare, threatened and persecuted species are treated as well.

In the U.S.A., knowledge of laws of biology, management practices and the characteristics of species populations is incomplete preparation for the student or manager. A sometimes bewildering and occasionally uneasy division of legal powers has evolved between the sovereign States, the Federal Government and the landowner, adding greatly to the complexities of effective management, as well as the numerous Federal and State organizations dealing in one way or another with wildlife.

This book, based on sound knowledge of technical work done to date, and taking account of interrelations with the other and usually dominant forms of land use concerned with wildlife management, remains constantly aware of present difficulties. Moreover, it will help students to take a balanced and positive place in the future evolution of wildlife management as part of the general field of natural resource conservation.

AMERICAN RESOURCES. J. Russell Whitaker & Edward A. Ackerman. pp. 497. Harcourt, Brace & Co. New York. 1951. U.S. $4.50.

Most writing on natural resources deals with a single resource, reference being made to others inasmuch as they concern the main subject, or treats the destructive aspect of the whole field with too little attention to the constructive side. Many, too, are in textbook form or present difficult reading for the intelligent layman.

If it is accepted that conservation involves all resources and their essential unity, and that the rate of progress in conservation is dependent on informed public support, then clearly there is need for books such as this, which cover the management and conservation of all resources and which are comprehensible to the ordinary reader.

Such is the quantity of reference material and so great the diversity and relative importance of the different resources in the various areas of the U.S.A. that to give an accurate and even adequate account of the subject presents a formidable task. Technicians or others primarily concerned with forests, grasslands, water, or any other single resource may be disappointed at the compression in individual chapters — obviously required to deal with the whole in a single moderate-sized volume. Such readers will find little that is new to them in their particular fields.

They will, however, find something above and beyond a mere compilation of authorities; the story of status and trends in use and abuse of each organic and inorganic resource; conservation measures, and whether and to what extent they are being applied; organization diagrams and charters of the many agencies dealing with natural resources are however omitted, since the authors have no panacea for the vexed problem of governmental reorganization in the fields of natural resources.

The opinions expressed are generally penetrating and discriminating, for example, in the little considered relations of mining to forestry. The authors hold firmly to the conclusion that regulation of private timber exploitation and further acquisition of forest lands unattractive to private ownership are necessary steps in forestry.

The authors' major contribution is "An American Citizen's Guide to Conservational Resource Management", an answer to the urgent but baffled question of the man in the street, "What can I do to help?" The ways are outlined; by personal elimination of waste; by stimulating and supporting prudent and effective governmental action and by applying social pressure against waste by industry and citizen alike.

This book deals primarily, but not exclusively, with one country, but other countries will doubtless find here a worthy example of one productive way to go about capturing the general public without whose effective support the best official plans will fail.

FORESTRY IN FARM MANAGEMENT. R. H. Westweld & the late Ralph H. Peck. (Revised edition 1951). pp. 340. John Wiley & Sons, Inc. New York. U.S. $5.00.

Much needed improvement of forestry on farms must come, in part, from an increase in the number of professional foresters who are trained in the particular methods, practices and controls applicable to the problems of farm owners to whom, generally, the forest is an incidental part of the whole property.

The publication of this second edition a decade after the first has been made necessary by the very large amount of new data accumulated as a result of research by many institutions and individuals, and by recent concepts of land use and their applicability to farm properties.

The problem of whether to deal with such subjects as protection from fire, grazing, insects, diseases, wild animals and climatic extremes as separate entities or not has been wisely solved by handling them as factors in improving and perpetuating farm forests along with such other elements as cutting, logging, soil preparation and slash disposal. The complete range of farm forest problems has been treated, including such aspects as measuring volume and growth, determining the most valuable products, marketing of products, best uses of wood on farms, managing for special products, etc.

Thus, as a teaching text the book is directed to the problems of the farm owner and to the methods and devices which the forester should know in order to be of service.

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[1] Gen. = *General*
Fund Sc. = *Fundamental Science*
Silv. = *Silviculture*
Log. & Eng. = *Logging and Engineering*
For. Inj. & Protec. = *Forest Injuries and Protection*
Mens. & Surv. = *Mensuration and Surveying*
For. Man. = *Forest Management*
Ind. & Trade = *Industry and Trade*
For. Prod. & Util. = *Forest Products and their Utilization*
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Forest Policy, Law, and Administration

A thorough, lucid study of forest policy with reference to specific laws in various countries. Available in English and French. 211 pp. Price $ 2.00.

FAO Technical Committee on Wood Chemistry

The proceedings of the fifth meeting of the above Committee, held at Appleton, Wisconsin, U.S.A., in September 1951, will shortly be published in the Forestry Studies Series. In the meantime, the series of papers on *Tropical Woods as a Source of Pulp* presented at the meeting has been reprinted in the April 1952 issue of TAPPI, which is published monthly in the U.S.A. by the Technical Association of the Pulp and Paper Industry. In an introduction, Harry F. Lewis, Dean, The Institute of Paper Chemistry, says "One of the important issues facing those interested in expansion in the manufacture and use of pulp and paper on a world-wide scale is the source of the fibrous raw material from which to make first the pulp and then the paper. Certainly the wood resources of the United States, Canada, and the western half of Europe cannot support in any permanent way a greatly increased industry, and the enormous wood resources of the U.S.S.R. are not available. It becomes necessary, therefore, to locate currently unused fibrous materials (and) define the possibilities inherent in the two greatest available fibrous reservoirs — namely, the tropical woods and the agricultural residues ... It will quickly become apparent that the problems of the forester and pulp manufacturer have not all been solved."

Other Forestry Studies

Two other forthcoming publications in FAO's Forestry Studies Series are **Elements of Forest Fire Control**, and **Grazing and Forest Economy**. Both of these deal with aspects of forestry which are of world-wide importance, and the latter especially is of the greatest concern at present, when emphasis is being more and more laid on integrating the proper use of land to achieve the maximum output of food and of industrial products.

These two important books are already in course of production and should appear within the next few months.

1951 Yearbook of Forest Products Statistics

Fifth Yearbook of international forest products statistics to be published by FAO. It contains 1950 official information on production and trade and revised data for 1949, as reported by more than one hundred countries and territories in reply to a standard questionnaire.

The statistical tables are preceded by a short text which gives some salient features of the 1950 world situation. World and regional figures given here include estimates for non-reporting countries; in the statistical tables, the totals are for reporting countries only.

This Yearbook provides the most consistent and useful body of international forest products statistics now available. The tables cover the following topics:

- ROUNDWOOD
  Total Output
  Sawlogs & Veneer Logs—Trade
  Pulpwood—Trade
  Pitprops—Output & Trade
- WOOD PULP, NEWSPRINT, PAPER AND PAPERBOARD, AND FIBERBOARDS
  Production — Consumption — Trade
- PROCESSED WOOD
  Lumber, Plywood, and Sleepers — Production — Consumption — Trade
- WORLD TRADE — Summary
  Volume of Imports and Exports
  Value of Imports and Exports
- COMPARATIVE DATA
  Forest Products Balances
  Per Caput Consumption of Forest Products
  Forest Areas

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